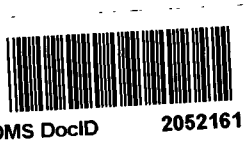
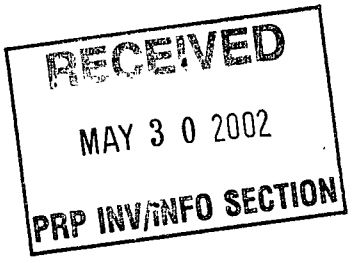


Stoney Creek Technologies, LLC
3300 West 4th Street Trainer, PA 19061-5112
(610) 494-3561 Phone (610) 497-3279 Fax

May 20, 2002



United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Attention: Ms. Carlyn Winter Prisk (3HS11)

Re: Information Requested Concerning the
Lower Darby Creek Area Superfund Site- Clearview Landfill,
Folcroft Landfill, and Folcroft Landfill Annex

Dear Ms. Prisk:

Stoney Creek Technologies is pleased to assist you as much as possible concerning this matter.

Thomas E. Mignanelli has never been employed by Stoney Creek Technologies, LLC. Mr. Mignanelli is an employee of Crompton Corporation. The president of Stoney Creek Technologies, LLC, is Samuel Thomas.

We have searched for the documentation that you requested and were not able to turn up much. Due to the changing of hands of this facility by 4 different companies and the document retention policy of Witco Corporation, a good amount of the information furnished was developed from the recollections of current employees of Stoney Creek Technologies, LLC. It is true that we did retain documentation related to the operations of this facility, unfortunately they do not go back to the period in question 1958 to 1976, and we as Stoney Creek Technologies have not destroyed any documentation which we received from Witco Corporation at the sale of this facility.

In our reply to your questions we have endeavored to be as clear and candid as possible to the fullest of our ability.

ORIGINAL (Red)

Sections of Enclosure A (reply to Questions) are considered company confidential and are marked so on each page.

If you have further questions please feel free to contact me directly at (610) 859-3504.

Sincerely,

Ray S. Brown
Safety, Health and Environmental Manager
Stoney Creek Technologies, LLC.

Attachments: Enclosure A

Attachments A through X

file

Enclosure A

REPLY TO QUESTIONS

The present name of this facility is:

Stoney Creek Technologies, LLC
3300 West 4th Street
Trainer, PA 19061-5112
(610) 494-3561 phone

a. Stoney Creek Technologies, LLC was organized in the State of Pennsylvania on June 29th, 1998. (See attachment A - Certificate of Organization)

b. Bryton Chemical Company originated in Matawan, NJ in 1947. Information concerning its incorporation in NJ at that time is not known but at some time the Bryton name was registered as a trademark. The first phases of the facility with property located in Trainer, Delaware County, PA was originally purchased by Robert L. Anderson, Jeanette M. Anderson, Vernon F. Beyer, Dorothy E. Beyer, E. Waldermar Carlson and Emily H. Carlson, Co-Partners, Bryton Chemical on 07-20-1953. Continental Oil Company (later CONOCO) purchased that facility on 01-08-1957. The facility was sold to WITCO Chemical Corporation on 06-29-1973. The facility was sold to Stoney Creek Technologies, LLC on 07-01-1998. (See attachment B - Historical Chain of Title)

c. The plant located at 3300 West 4th Street Trainer, PA 19061-5112 is the sole facility owned by Stoney Creek Technologies, LLC, which is also the parent company.

2. The current nature of business is the production of rust preventative compounds and oil additives. Bryton Chemical as well as WITCO Chemical nature of business during the period in question was the same.

3. The following persons may have knowledge of the operations and waste practices during the years between 1958 and 1976.

Andrew H. Melinchuk — Office Administrator, employed from 1953 to 1990.
1167 Putnam Blvd. Wallingford, PA 19086 (610) 876-1162.

Vincent J. Cease — Technical Director, employed from 1955 to 1998.
Kennett Square, PA

4. There are no documents available that pertain to the period form 1958 through 1976. When CONOCO sold the facility to Witco Corporation in 1973, they took all of any documents that pertained to CONOCO or Continental Oil Company with them. In 1991 WITCO sent down a corporate policy manual that covered record retention. We were unsuccessful in locating the record retention schedule (See attachment C - record retention policy, Witco Corporation Manual).

   a. Andrew H Melinchuk and Vince J. Cease may be able to provide information as to any information that could have been included in any documentation concerning waste in that era.

   b. Not known. No documents located for this period. CONOCO employees took documents from 1958 to 1973.

c. No documents located for this period. CONOCO employees took documents from 1958 to 1973.

5. The following are the raw materials, intermediate and finished products that were used by Bryton Chemical.

20% Oleum	MSDS attachment D
Sodium hydroxide	MSDS attachment E
Ammonium hydroxide	MSDS attachment F
Hexane	MSDS attachment G
Ethylene glycol monomethyl ether	MSDS attachment H
Isopropyl alcohol	MSDS attachment I
Hexane sulfonic acid	No MSDS available
Barium oxide	**No** MSDS attached
Barium hydroxide monohydrate	MSDS attachment J
Methanol	MSDS attachment K
Magnesium intermediate	MSDS attachment L
Barium intermediate	**No** MSDS available
Calcium intermediate	**No** MSDS available
Acid purification filter cake	**No** MSDS available.
Barium intermediate filter cake	**No** MSDS available
Barium based sulfonates:	
B70 Sulfonate	MSDS attachment M
B50N Sulfonate	MSDS attachment N
B50S Sulfonate	MSDS attachment O
Magnesium based sulfonates:	
M300 Sulfonate	MSDS attachment P

M400 Sulfonate	MSDS attachment Q
Calcium Based sulfonates:	
C300T Sulfonate	MSDS attachment R

C300 Petronate	MSDS attachment S
SACI 100	MSDS attachment T
SACI 200	MSDS attachment U
SACI 300	MSDS attachment V
SACI 700	MSDS attachment W

NOTE: The SACI MSDS provided are from WITCO Corporation due to the fact that they owned the product and trademarks at that time. The SACI trademark is now owned by Stoney Creek Technologies, LLC.

Sodium Based sulfonates:	
Bryton 430	No MSDS available
Bryton 445	No MSDS available
Bryton T	No MSDS available
Ammonium Sulfonate	No MSDS available

a. The following is a list of the chemicals purchased, used in production, or produced at the facility during the period in question. There are no records or documents available concerning the purchases, quantities, or vendors purchased from. Vendors identified in 5.f are from recollections.

b.

Chemical	**Physical state**	**Use in production**

Oleum	Liquid	Sulfonation of natural and synthetic alkylates to produce hexane sulfonic acid. This acid was a process intermediate that was used to produce all sulfonates.
Acid purification filter cake	Solid with free liquids	The waste from the acid purification process, comprised of hexane sulfonic acid, neutralized sulfuric acid, mag carbonate, and diatomaceous earth.
Hexane	Liquid	Processing aid used in all products
Ethylene glycol monomethyl ether	Liquid	Processing aid used in all products except sodium based
Methanol	Liquid	Processing aid used in all products
Sodium hydroxide	Liquid	Intermediate used sodium production
Ammonium hydroxide	Liquid	Intermediate used in ammonium sulfonate production.
Isopropyl alcohol	Liquid	Processing aid used in sodium sulfonates.
Barium oxide monohydrate	Powder	Raw material used in making barium intermediate.
Barium intermediate	Liquid	Intermediate used in making Barium sulfonate, comprised of Barium oxide monohydrate, and methanol.
Barium intermediate filter cake	Solid with free liquids	Waste from barium intermediate process, comprised of barium oxide and later barium hydroxide monohydrate, methanol and diatomaceous earth.
Magnesium intermediate	Liquid	Used in the magnesium sulfonate production, comprised of magnesium ingots dissolved in ethylene glycol monomethyl ether, and carbon dioxide.
Calcium intermediate	Liquid	Used in the calcium sulfonate and SACI production, comprised of calcium carbide dissolved in ethylene glycol monomethyl ether and carbon dioxide.

b. All chemicals and processing aids were in a liquid state, except as stated in 5.a.

c. No records found for this period.

d. No records found for this period.

e. No records found for this period.

f. Oleum - General Chemical / Allied Chemical.
Calcium Intermediate - CONOCO Baltimore, MD plant.
None other known.

6. There are only a few wastes that were generated that could be identified by memory. There were no records or documents found to support these memories or the amounts generated. Documentation of the method of treatment or disposal was also not found.

Spent oleum (100% sulfuric acid) - liquid - returned back to General/ Allied Chemical for regeneration back into Oleum.

Acid filter cake (Hexane sulfonic acid and mag carbonate in diatomaceous earth) - solid with free liquids - hauled off by either Eastern Industrial or Gene Banta.

Barium intermediate filter cake (Barium Oxide, and later due to the reactivity issues, Barium Hydroxide monohydrate, diatomaceous earth, and methanol) - solids with free liquids - not known who the hauler was.

7. It is not known nor are there any records or documentation as to who contracted for the waste disposal arrangements. Trucks from Eastern Industrial and Gene Banta were remembered as being in this facility.

ORIGINAL (Red)

8. It is believed that Andrew H Melinchuk (See address in section 3 above) could have been in charge of waste disposal, but there are no documents that can be found to support this memory and it is not remembered as to where the wastes were sent.

Company Confidential

9. No records or documentation were found to answer this question.

10. No records or documentation were found to answer this question.

11. It is believed that Andrew H. Melinchuk (See address in section 3) could have been in charge but there were no records found to support this.

12. None are known.

13. Stoney Creek Technologies is not responsible and is not liable, including liability under CERCLA, for cost associated with the cleanup of any waste, or products disposed of by Continental Oil Company, or by WITCO or its successor Crompton Corporation. A copy of the environmental agreement section of the asset purchase agreement is attached (attachment X), which shows that Stoney Creek Technologies is indemnified of preexisting or unknown environmental liability (See Article 4.4).

14 Stoney Creek Technologies representatives.

a. Samuel C. Thomas Jr, President and Plant Manager of Stoney Creek Technologies, LLC 3300 West 4th Street, Trainer, Pa 19061-5112. (610) 494-3561 phone, (610) 497 3279 fax.

Ray S. Brown, Safety, Health and Environmental Manager of Stoney Creek Technologies, LLC 3300 West 4th Street, Trainer, PA 19061-5112. (610) 859-3504 phone, (610) 497-3279 fax.

b. Ray S Brown, Safety Health and Environmental Manager of Stoney Creek Technologies, LLC 3300 West 4th Street, Trainer, PA 19061-5112. (610) 859-3504 phone, (610) 497-3279 fax.

14. It is believed that the documents requested by this solicitation are no longer available. It is believed that they were trashed according to the WITCO Corp policy. (See attachment C, record retention policy), for information requested from 1973 to 1976. Employees of CONOCO removed the records, documents, and information from 1958 to 1973 from the facility in 1973 when the plant was sold to WITCO Corp. Their location or existence are unknown by the writers.

ATTACHMENT A

ORIGINAL (RED)

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF STATE

JUNE 29, 1998

TO ALL WHOM THESE PRESENTS SHALL COME, GREETING:

I DO HEREBY CERTIFY THAT,

STONEY CREEK TECHNOLOGIES, LLC

is duly organized as a Pennsylvania Limited Liability Company under the laws of the Commonwealth of Pennsylvania and remains subsisting so far as the records of this office show, as of the date herein.

SECRETARY OF THE COMMONWEALTH PENNSYLVANIA

IN TESTIMONY WHEREOF, I have hereunto set my hand and caused the Seal of the Secretary's Office to be affixed, the day and year above written.

Secretary of the Commonwealth

DPOS

ATTACHMENT B

ORIGINAL (Red)

1. HISTORICAL CHAIN OF TITLE

1. DEED:
   - RECORDED: 04-25-1895
   - GRANTOR: John B. Hinkson, et ux
   - GRANTEE: Benjamin D. Johnson, Mary E. Johnson, Frances M. Bunting and Henrietta H. Johnson
   - INSTRUMENT: R8-142
   - COMMENTS: Tract 4
   - NOTE: Benjamin D. Johnson died 10-29-1900, leaving premises to 3 sisters Mary E. Johnson, Frances M. Bunting and Henrietta H. Johnson.
     Frances M. Bunting died 10-15-1902, leaving premises to 2 remaining sisters, Mary E. Johnson and Henrietta H. Johnson
     Mary E. Johnson died 02-04-1911, leaving premises to remaining sister, Henrietta H. Johnson
     Henrietta H. Johnson died 03-12-1925, leaving premises to Elizabeth Hooven and Mary Catrow

2. DEED:
   - RECORDED: 03-28-1914
   - GRANTOR: J. Frank Black and Sue C. Black
   - GRANTEE: Joseph H.W. Hinkson
   - INSTRUMENT: 370-484
   - COMMENTS: Tract 1, Tract 2 and Tract 3

3. DEED:
   - RECORDED: 01-22-1926
   - GRANTOR: Joseph H. Hinkson
   - GRANTEE: T Woodward Trainer and Mary M. Trainer
   - INSTRUMENT: 699-172
   - COMMENTS: Tract 1 and Tract 2

4. DEED:
   - RECORDED: 07-13-1928
   - GRANTOR: T. Woodward Trainer and Mary M Trainer
   - GRANTEE: G. Leonard Crosgrove
   - INSTRUMENT: 812-242
   - COMMENTS: Tract 1

5. DEED:
   - RECORDED: 10-16-1928
   - GRANTOR: G. Leonard Crosgrove and Frances B. Crosgrove
   - GRANTEE: Delco Concrete Products
   - INTRUMENT: 839-94
   - COMMENTS: Tract 1

6. DEED:
   - RECORDED: 12-12-1928
   - GRANTOR: A.B. Geary, et al
   - GRANTEE: William S. Miller
   - INSTRUMENT: 786-538
   - COMMENTS: Tract 5

7. SHERIFF'S DEED:
   - RECORDED: 07-29-1933
   - GRANTOR: Sheriff of Delaware County
   - GRANTEE: Iron Workers Building Association
   - INSTRUMENT: 966-470
   - COMMENTS: Tract 5
   - NOTE: Sold by William Miller

8. DEED:
   - RECORDED: 04-30-1934
   - GRANTOR: James A. Cochrane, receivers in Bankruptcy for Delco Concrete Products Company
   - GRANTEE: George L. Crosgrove
   - INSTRUMENT: 974-406
   - COMMENTS: Tract 1

9. DEED:
   - RECORDED: 09-24-1937
   - GRANTOR: Iron Workers Building Association
   - GRANTEE: Howard R. Bostwick
   - INSTRUMENT: 878-492
   - COMMENTS: Tract 5

10. DEED:
    - RECORDED: 10-27-1939
    - GRANTOR: Mary A. Catrow, widow, Claude C. Hooven and Elizabeth J. Hooven
    - GRANTEE: Samuel Moschella
    - INSTRUMENT: 1093-61
    - COMMENTS: Tract 4, recites to R8-142

ORIGINAL (Red)

11. DEED:

RECORDED:	10-27-1939
GRANTOR:	Mary A. Catrow, widow, Claude C. Hooven and Elizabeth J. Hooven
GRANTEE:	Samuel Moschella
INSTRUMENT:	1093-415
COMMENTS:	Tract 4, recites to R8-142

12. DEED:

RECORDED:	05-29-1947
GRANTOR:	Gash-Stull Co.
GRANTEE:	Industrial and Farm Equipment Corp.
INSTRUMENT:	1357-142
COMMENTS:	Part of Tract 4 – 15' Wide Easement

13. SHERIFF'S DEED:

RECORDED:	06-27-1951
GRANTOR:	Sheriff of Delaware County
GRANTEE:	Gash-Stull Company
INSTRUMENT:	Information not on record
COMMENTS:	Tract 2
NOTE:	Sold by T. Woodward Trainer

14. DEED:

RECORDED:	12-18-1951
GRANTOR:	Bessie Ward Hinkson, widow and Joseph H.W. Hinkson, aka J.H. Ward Hinkson and Edith Haines Hinkson (heirs)
GRANTEE:	Acetogen Fabricators, Inc.
INSTRUMENT:	1621-74
COMMENTS:	Tract 3
NOTE:	Joseph Hinkson deceased 02-14-1926

15. DEED:

RECORDED:	04-03-1952
GRANTOR:	Gash Stull Company
GRANTEE:	Gideon M. Stull, E.M. Welsh, Elmer L. Peterson, Jr., T.P. Davis
INSTRUMENT:	1631-268
COMMENTS:	Tract 2

ORIGINAL (Red)

16. DEED:

RECORDED:	07-20-1953
GRANTOR:	Gideon M. Stull and Mildred Stull, E.M. Welsh and Edwina L. Welsh, Elmer L. Peterson, Jr. and Helen V. Peterson, T.P. Davis and Frances C. Davis
GRANTEE:	Robert L. Anderson, Jeanette M. Anderson, Vernon F. Beyer, Dorothy E. Beyer, E. Waldermar Carlson and Emily H. Carlson, Co-Partners, Bryton Chemical
INSTRUMENT:	1687-212
COMMENTS:	Tract 2

17. DEED:

RECORDED:	03-12-1956
GRANTOR:	George L. Crosgrove, widower
GRANTEE:	Robert L. Anderson, Jeanette M. Anderson, Vernon F. Beyer, Dorothy E. Beyer, E. Waldermar Carlson and Emily H. Carlson, Co-Partners, Bryton Chemical Company
INSTRUMENT:	1816-162
COMMENTS:	Tract 1

18. DEED:

RECORDED:	01-08-1957
GRANTOR:	Robert L. Anderson, Jeanette M. Anderson, Vernon F. Beyer, Dorothy E. Beyer, E. Waldermar Carlson and Emily H. Carlson, Co-Partners, Bryton Chemical Company
GRANTEE:	Continental Oil Company
INSTRUMENT:	1865-3
COMMENTS:	Tract 1 and Tract 2

19. DEED:

RECORDED:	02-10-1961
GRANTOR:	Samuel Moschella and Millie Moschella
GRANTEE:	William M. Bohrer
INSTRUMENT:	2052-147
COMMENTS:	Tract 4

20. DEED:

RECORDED:	01-09-1962
GRANTOR:	Gash Stull Co.
GRANTEE:	Industrial and Farm Equipment Corp.
INSTRUMENT:	1914-56
COMMENTS:	Part of Tract 4 – 15' Wide Easement

21. AWARD OF REAL ESTATE:
    - RECORDED: 10-22-1962
    - GRANTOR: Orphans Court of Delaware County
    - GRANTEE: Myrtle N. Bostwick, survivor of Howard R. Bostwick
    - INSTRUMENT: 2111-584
    - COMMENTS: Tract 5

22. DEED:
    - RECORDED: 03-30-1964
    - GRANTOR: Willaim M. Bohrer and Frances A. Bohrer
    - GRANTEE: Tyler C. Bohrer and Jean R. Bohrer
    - INSTRUMENT: 2171-52
    - COMMENTS: Tract 4

23. DEED:
    - RECORDED: 04-07-1963
    - GRANTOR: Gash-Stull Company (successor to merger with Industrial and Farm Equipment Corporation)
    - GRANTEE: Fisher Tank Company
    - INSTRUMENT: 2203-395
    - COMMENTS: Part of Tract 4 – 15' Wide Easement

24. DEED:
    - RECORDED: 07-05-1967
    - GRANTOR: Ross Fabricators, Inc. (formerly known as Acetogen Fabrication)
    - GRANTEE: Continental Oil Company
    - INSTRUMENT: 2275-733
    - COMMENTS: Tract 3

25. DEED:
    - RECORDED: 07-07-1967
    - GRANTOR: Fisher Tank Company
    - GRANTEE: Continental Oil Company
    - INSTRUMENT: 2276-1026
    - COMMENTS: Part of Tract 4 – 15' Wide Easement

26. DEED:
    - RECORDED: 02-09-1970
    - GRANTOR: Tyler C. Bohrer and Jean R. Bohrer
    - GRANTEE: Continental Oil Company
    - INSTRUMENT: 2362-361
    - COMMENTS: Tract 4

27. DEED:

RECORDED:	05-17-1971
GRANTOR:	Myrtle N. Bostwick, widow
GRANTEE:	Continental Oil Company
INSTRUMENT:	2397-334
COMMENTS:	Tract 5

28. DEED:

RECORDED:	11-15-1971
GRANTOR:	Tyler G. Bohrer and Jean R. Bohrer
GRANTEE:	Calbert Farris and Audrey G. Farris
INSTRUMENT:	2416-488
COMMENTS:	Tract 4

29. DEED:

RECORDED:	06-29-1973
GRANTOR:	Continental Oil Company
GRANTEE:	Witco Chemical Corporation
INSTRUMENT:	2474-17
COMMENTS:	Tract 1, Tract 2, Tract 3, Part of Tract 4 – 15' Wide Easement, Tract 5

30. DEED:

RECORDED:	11-22-1976
GRANTOR:	Tyler G. Bohrer and Jean R. Bohrer
GRANTEE:	Witco Chemical Corporation
INSTRUMENT:	2589-436
COMMENTS:	Tract 4

31. DEED:

RECORDED:	10-10-1979
GRANTOR:	Calbert Farris and Audrey G. Farris
GRANTEE:	Calbert Farris
INSTRUMENT:	2714-190
COMMENTS:	Tract 4

32. DEED:

RECORDED:	11-25-1980
GRANTOR:	Calbert Farris
GRANTEE:	Witco Chemical Corporation
INSTRUMENT:	2764-1124
COMMENTS:	Tract 4

ATTACHMENT C

WITCO CORPORATE MANUAL

ORIGINAL (Red)

RECORD RETENTION

POLICY:

Each of the Company's department and divisions (including its international subsidiaries) shall create and implement an appropriate records retention program that meets the following guidelines.

GUIDELINES:

1. All records are to be retained for at least the minimum retention period as stated in applicable national, state or Federal laws and regulations.

2. All records which may substantially affect the obligations of the Company must be retained for a period of time that will reasonably assure the availability of those records when needed.

3. Adequate records must be maintained to document the Company's compliance with all relevant laws.

4. Records that require specific retention periods must be held until their retention period, as set forth in the Record Retention Schedule, expires. Records that do not require specific retention periods should be kept as long as they are actively used, are pertinent or in effect, and have not been superseded by more up-to-date material.

5. The privacy and security of records, particularly personnel records, must be appropriately assured.

6. Records contained on magnetic tape of other electronic data processing storage media must be covered by the program.

PROCEDURE:

1. The general manager or department head of each division, department, or international subsidiary is responsible for seeing that an appropriate records retention program is established for its records.

2. Until changed, all Record Retention Schedules in effect on September 1, 1991, shall remain in effect until changed in accordance with this procedure.

3. Each general manager or department head shall promptly provide the Corporate Secretary, and the Legal and Tax Departments, with a report describing current storage and retention practices. An updated report shall be filed annually thereafter.

4. The Legal and Tax Departments shall be responsible for approving all written record retention programs. Operating units may submit changes to Record Retention Schedules, storage practices, or document destruction practices for approval at any time to the Legal and Tax Departments. The Corporate Secretary shall be responsible for auditing the actual implementation of such policies.

5. As an exception to local retention of records, originals of contracts and agreements shall in all cases be sent to the Legal Department, and all corporate records of Witco Corporation or its subsidiaries (except as otherwise required by applicable law) shall be sent to the Corporate Secretary.

6. The Corporate Secretary shall supervise central retention of records and destruction of records centrally retained at the expiration of the retention period set forth in the applicable Record Retention Schedule.

AUTHORITY GUIDE
(See Appendix for Definition of Terms)

SECTION 16: FACILITY MANAGEMENT

INT'L SUB	ACTION	REF.	ENDORSEMENT REQUIRED	FINAL AUTHORITY LEVEL	FINAL AUTHORITY LIMIT
	16.1 RECORD RETENTION				
	.1 Approving written record retention programs and all subsequent changes to the record retention schedule, storage practices or document destruction practices	WCM Policy	G.M./D.H.	General Counsel Assistant Controller - Tax	
X	.2 Approving requests to destroy Company records, as identified by policy	WCM Policy		**REQUIRED SIGNATURES:** Assistant Controller Controller G.M./D.H.	
	.3 Approval of record transfers	WCM Policy		**TWO SIGNATURES REQUIRED:** Department Manager Record Retention Supervisor	
	16.2 OFFICE SIZE AND FURNISHING				
	.1 Exceptions to office size and furnishing guidelines			G.M./D.H.	
	16.3 BUILDING CLOSURES				
	.1 Authorization to close building due to inclement weather: a. Woodcliff Lake			Highest Available Location Manager	
	b. New York			C.F.O.	
	c. All Others			G.M./D.H.	
	16.4 FIRE DRILLS				
	.1 Authorization to exercise fire drills			Location Facility Manager	

ORIGINAL (Red)

ATTACHMENT D

General Chemical

PRODUCT SAFETY DATA SHEET

OLEUM

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ C.A.S. No. ☐ GENERAL PRODUCT CODE #
OLEUM (Fuming Sulfuric Acid)	Sulfuric Acid 7664-93-9 Sulfur Trioxide 7446-11-9

CHEMICAL NAME AND/OR SYNONYM

Sulfuric Acid - Sulfur Trioxide mixture

FORMULA	% Free SO_3	% Act. H_2SO_4	% Equiv. H_2SO_4
15-35 wt. % SO_3	15	85	103.4
85-65 wt. % H_2SO_4	35	65	107.9

MOLECULAR WEIGHT

SO_3: 80.06

H_2SO_4: 98.08

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

General Chemical Corporation
90 East Halsey Road
Parsippany, NJ 07054-0389

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Manager of Product Safety	(973) 515-1840	September, 1986	January, 1991

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(800) 631-8050

SKIN OR EYES: Immediately flush with plenty of water, continuing for at least 15 minutes. Remove contaminated clothing while flushing. Continue flushing with water if medical attention is not immediately available.

INGESTION: Do not induce vomiting. If conscious, give several glasses of milk (preferred) or water.

INHALATION: Remove to fresh air. Observe for possible delayed reaction. If breathing has stopped, give artificial respiration. If breathing with difficulty, give oxygen, provided a qualified operator is available.

GET IMMEDIATE MEDICAL ASSISTANCE for ingestion, inhalation, eye contact, irritation, or burns.

C. HAZARDS INFORMATION

HEALTH

INHALATION

Inhalation of fumes or acid mist can cause irritation or corrosive burns to the upper respiratory system, including nose, mouth, and throat. Lung irritation and pulmonary edema can also occur.

INGESTION

Can cause irritation and corrosive burns to mouth, throat, and stomach. Can be fatal if swallowed.

SKIN

Can cause severe burns.

EYES

Liquid contact can cause irritation, corneal burns, and conjunctivitis. Blindness may result, or severe or permanent injury. Mist contact may irritate or burn.

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J)

1 mg/cu.m. (as 100% H_2SO_4) OSHA-TWA

3 mg/cu.m. (as 100% H_2SO_4) ACGIH-STEL

BIOLOGICAL

UNUSUAL CHRONIC TOXICITY

(1) Erosion of teeth, (2) lesions of the skin, (3) tracheo-bronchitis, (4) mouth inflammation, (5) conjunctivitis, (6) gastritis. Reference (a).

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT °C	AUTO IGNITION TEMPERATURE °C	FLAMMABLE LIMITS IN AIR (% BY VOL.)
Not flammable ☐ OPEN CUP ☐ CLOSED CUP	Not applicable	LOWER — NA UPPER — NA

UNUSUAL FIRE AND EXPLOSION HAZARDS Open containers will release SO_3 gas, which is readily converted to sulfuric acid mist in air. Will react violently with water. Can ignite some combustibles and organics. Heat increases pressure and may explode container. Explosive hydrogen gas may be generated in metal containers.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Use water spray or other suitable agent for fires adjacent to non-leaking tanks or other containers of Oleum.

FIRE ESTINGUISHING AGENTS TO **AVOID**

Do not use solid water streams near ruptured tanks or spills of Oleum. Acid reacts violently with water and can spatter acid onto personnel.

SPECIAL FIRE FIGHTING PRECAUTIONS

At high temperatures, sulfuric acid mist or sulfuric trioxide gas can be released from vented or ruptured containers. If water is added to Oleum, violent spattering can occur, and considerable heat may be evolved. Wear NIOSH-approved self-contained breathing apparatus with full facepiece and full protective clothing. Cool non-leaking fire-exposed containers with water spray.

VENTILATION

Sufficient to reduce vapor and acid mists to permissible levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems. Corrosion-proof construction recommended.

NORMAL HANDLING

Keep sources of ignition away. Do not get in eyes, on skin, on clothing. Do not breathe vapor or mist. Use with adequate ventilation and use protective equipment as outlined in Section E. Procedures are detailed in references listed in Section J. Never mix water and Oleum, as a violent reaction will occur.

STORAGE

Store in cool, well-ventilated area away from combustibles and reactive chemicals. Vent metal containers weekly or more frequently in hot weather to prevent hydrogen gas build-up. Store away from sources of ignition.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT — SECTION E)

If the resulting spattering and violent reaction can be contained, dilute small spills or leaks cautiously, from a distance, with plenty of water. Neutralize residue with alkali such as soda ash or lime. Adequate ventilation is required with soda ash due to release of carbon dioxide gas. Otherwise, use an inert absorbent. Personnel should wear full protective equipment. (See Section I for waste disposal methods.) Attempt to keep out of sewer. Any release to the environment of this product may be subject to Federal and/or state reporting requirements. Check with appropriate agencies.

SPECIAL: PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS **SIGNAL WORD** - DANGER!

Causes severe burns. Vapor extremely hazardous — irritating to eyes and respiratory tract. Before unloading put on full protective clothing including full face shield.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

Where required, use a respirator approved by NIOSH for sulfuric acid or mists, as applicable. Some exposures may require a self-contained breathing apparatus with full facepiece or supplied-air respirator with a full facepiece, helmet, or hood. — References (d, e, f).

EYES AND FACE

As a minimum, wear hard hat, chemical safety goggles, and full-face plastic shield. Do not wear contact lenses. For increased protection, use supplied-air acid hood.

HANDS, ARMS, AND BODY

As a minimum, wear acid-resistant apron, protective clothing, boots and gauntlet gloves for routine product use. For increased protection, include acid-resistant trousers and jacket.

OTHER CLOTHING AND EQUIPMENT

Eyewash and quick-drench shower facilities, protected from freezing, should be available wherever Oleum is stored or handled.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Colorless to cloudy liquid. Sharp penetrating odor.	
BOILING POINT *a. 141 °C b. 108 MELTING POINT *a. 2 °C b. 2.5	SPECIFIC GRAVITY (H_2O = 1) *a. 1.882 b. 1.961	VAPOR DENSITY (AIR = 1) Approx. 2.6 @ 15°C
SOLUBILITY IN WATER (% by Weight) Complete	pH 1% H_2SO_4 solution; pH = 0.9	VAPOR PRESSURE (mm Hg at 20°C) ☒ (PSIG) ☐ *a. 2 b. 6
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☐ Unknown	% VOLATILES BY VOLUME (At 20°C) Unknown	*a. 20% SO_3 b. 35% SO_3

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	At normal temperatures, sulfur trioxide gas is evolved. This is accelerated at higher temperatures. This gas is toxic, corrosive, and an oxidizer.

INCOMPATIBILITY (MATERIALS TO AVOID)

Nitro compounds, carbides, dienes, water alcohols (when heated): cause explosions — Ref. (h, i, j). Oxidizing agents, such as chlorates and permanganates: cause fires and possible explosions. Allyl compounds and aldehydes: undergo polymerization, possibly violent — Ref. (h), (continued, Section K).

HAZARDOUS DECOMPOSITION PRODUCTS

Sulfur trioxide gas: see above. Also this is a fire risk if in contact with organic materials.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	NA

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
Sulfur Trioxide / 7446-11-9	15-35	See Section C
Sulfuric Acid / 7664-93-9	65-85	See Section C

* = PROPRIETARY — TRADE SECRET

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY

Aquatic Toxicity:
24.5 ppm/24 hr./bluegill/lethal/fresh water
42.5 ppm/48 hr./prawn/LC_{50}/salt water
(The Coast Guard lists the same data for oleum as for sulfuric acid in its CHRIS system.)

OCTANOL/WATER PARTITION COEFFICIENT

ORIGINAL (Red)

EPA HAZARDOUS SUBSTANCES? (CLEAN WATER ACT SECT. 311)	[X] YES	[ ] NO	IF SO, REPORTABLE QUANTITY: 1000 # (as 100% H_2SO_4)	40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Consult supplier, as dilution and neutralization can be very hazardous. If the resulting violent reaction can be contained, waste oleum should be cautiously diluted with water and neutralized with an alkali. Neutralized waste must be disposed of in accordance with applicable disposal regulations. Waste may have to be disposed of by an approved waste disposal contractor. (Unneutralized material is EPA corrosive waste — D002).

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED	HAZARDOUS WASTE NUMBER: (IF APPLICABLE)	40 CFR 261.22, .23
EPA Hazardous Waste.	No. D002 (Corrosive)/No. D003 (Reactive)	

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

(1) OSHA standard at 29 CFR 1910.1000 (1989)

(2) TLV from the ACGIH 1990-91 list, "Threshold Limit Values for Chemical Substances...".
Am. Conf. of Governmental Industrial Hygienists, Cincinnati 45202.

REGULATORY STANDARDS	D.O.T. CLASSIFICATION: Corrosive material	49 CFR 173
DOT ID Number: NA 1831		

GENERAL

(a) **Documentation of the Threshold Limit Values**, 4th Edition, 1981, Am. Conf. of Governmental Hygienists, Cincinnati 45202, entry: "Sulfuric Acid".
(b) Allied-Signal wall chart.
(c) General Chemical product information bulletin.
(d) "Criteria for a Recommended Standard....Occupational Exposure to Sulfuric Acid", NIOSH U.S. Dept. of HHS, 1974, PB 233098, Nat. Tech. Info. Service, Springfield, VA 22161.
(e) NIOSH/OSHA, "Pocket Guide to Chemical Hazards...", 1985. See Section K

K. ADDITIONAL INFORMATION

J. REFERENCES — (continued)
(f) "NIOSH/OSHA — Occupational Health Guidelines for Chemical Hazards — Sulfuric Acid", 1978.
(g) General Chemical Technical Service Report for storage and handling procedures.
(h) NFPA Manual 491M, "Manual of Hazardous Chemical Reactions, 1975, Nat. Fire Protection Assoc., Boston 02210.
(i) General Chemical Corporation Product Safety Data Sheet for Sodium Sulfite, 1990.
(j) Bretherick, L., **Handbook of Reactive Chemical Hazards**, 2nd ed., 1979, Butterworths, Boston.

G. REACTIVITY DATA — Incompatibility (continued)

Alkalis, amines, hydrated salts, carboxylic acid anhydrides, nitriles, olefinic organics, glycols, aqueous acids: cause strong exothermic reactions. — Ref. (h, j). Carbonates, cyanides, sulfides, sulfites, metals such as copper: yield toxic gases. — Refs. (i, j). Also for metals, see hydrogen generation, Section C.

Information (hazards, precautions, first aid, etc.) is abbreviated. More detailed information is contained in references found in Section J.

NOTICE: This product contains **Sulfuric Acid**, CAS # 7664-93-9, % by weight 65-85, a toxic chemical subject to the reporting requirements of *Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372. This information must be included in all* MSDS's that are copied and distributed for this product.

PSDS FILE No. - GC-2003

OxyChem®

Responsible Care®
Good Chemistry at Work

ORIGINAL (Red)

MATERIAL SAFETY DATA SHEET

Revised

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS NUMBER : M32415 **ISSUE DATE :** 07-30-01

PRODUCT NAME : CAUSTIC SODA LIQUID (ALL GRADES)

Manufacturer's Name and Address : Occidental Chemical Corporation, Occidental Tower
5005 LBJ Freeway, P.O. Box 809050
Dallas, TX 75380 (972) 404-3800

24 HOUR EMERGENCY TELEPHONE : 1-800-733-3665 OR 972-404-3228

TO REQUEST AN MSDS : 1-800-699-4970

CUSTOMER SERVICE : 1-800-752-5151

PRODUCT USE : Metal finishing, industrial cleaners, chemical processing, petroleum industry

CHEMICAL NAME : Sodium hydroxide

CHEMICAL FORMULA : NaOH

SYNONYMS/COMMON NAMES : Sodium hydroxide solution

Revised

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS NUMBER / NAME
7732-18-5 Water

EXPOSURE LIMITS
PEL: Not Established
TLV: Not Established
PELZ2:Not Established

PERCENTAGE
VOL ND
WT 48.5-94.5

COMMON NAMES:
(MW 18.02)

Listed On(List Legend Below):
00 19 22 23 51

2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)

ORIGINAL (Red)

1310-73-2 Sodium hydroxide (Na(OH))

EXPOSURE LIMITS
PEL: 2 MG/M3 CEIL
TLV: 2 MG/M3 CEIL
PELZ2:Not Established

PERCENTAGE
VOL ND
WT 5.5-51.5

COMMON NAMES:
CAUSTIC SODA (MW 40.00)

Listed On(List Legend Below):
00 12 13 21 22 51 56 57

- -

7647-14-5 Sodium chloride (NaCl)

EXPOSURE LIMITS
PEL: Not Established
TLV: Not Established
PELZ2:Not Established

PERCENTAGE
VOL ND
WT 0-1.3

COMMON NAMES:
Salt (MW 58.4)

Listed On(List Legend Below):
00 22 23 51

- -

LIST LEGEND

00 TSCA INVENTORY	12 PA HAZARDOUS SUBSTANCE
13 PA ENVIROMENTAL HAZ SUBSTANCE	19 PA REQUIREMENT- 3% OR GREATER
21 NJ SPECIAL HEALTH HAZ SUB	22 CANADIAN DOMESTIC SUB LIST
23 NJ REQUIREMENT- 1% OR GREATER	51 EINECS
56 OSHA PERMISSIBLE EXPOSURE LIM.	57 ACGIH THRESHOLD LIMIT VALUES

Revised

3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********
*
* MAY CAUSE BURNS TO THE EYES, SKIN, RESPIRATORY AND *
* GASTROINTESTINAL TRACT. MAY CAUSE PERMANENT EYE DAMAGE. *
*
* Clear liquid with no distinct odor *
****

POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY:

Inhalation, Ingestion.

TARGET ORGANS:

Eyes, Skin, Respiratory Tract, Gastrointestinal Tract.

3. HAZARDS IDENTIFICATION (Continued)

IRRITANCY:

All routes of exposure, Corrosive.

SENSITIZING CAPABILITY:

None known.

REPRODUCTIVE EFFECTS:

None known.

CANCER INFORMATION:

Not classified as carcinogenic by NTP, IARC, OSHA, ACGIH, or NIOSH.

SHORT-TERM EXPOSURE (ACUTE)

INHALATION:

Exposure can produce burns.

EYES:

Corrosive.

Contact may cause burns and tissue destruction.

The severity of the effects depend on concentration and how soon after exposure the area is washed.

MAY CAUSE PERMANENT EYE DAMAGE.

SKIN:

Corrosive.

Contact may cause burns and tissue destruction.

May cause burns that are not immediately noticed or painful.

INGESTION:

Corrosive.

Contact may cause burns and tissue destruction.

REPEATED EXPOSURE (CHRONIC)

None known.

SYNERGISTIC MATERIALS:

None known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

None known.

Revised

4. FIRST AID MEASURES

ORIGINAL (Red)

EYES:

Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN:

Immediately flush contaminated areas with water. Remove contaminated clothing and footwear. Wash contaminated areas with plenty of soap and water. Wash clothing before reuse. Discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

INHALATION:

Remove to fresh air if safe to transport. Otherwise attempt to provide fresh air by ventilation. If breathing is difficult, have a trained person administer oxygen. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY (911 or emergency transport services).

INGESTION:

Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

NOTES TO PHYSICIAN:

No specialized procedures. Treat for clinical symptoms.

Revised

5. FIRE FIGHTING MEASURES

Flash Point: Not applicable

Method: Not applicable

Autoignition Temperature: Not applicable

FLAMMABLE LIMITS IN AIR, BY % VOLUME

Upper: Not applicable
Lower: Not applicable

EXTINGUISHING MEDIA:

Non-flammable / Non-combustible.

Use agents appropriate for surrounding fire.

ORIGINAL (Rsd)

5. FIRE FIGHTING MEASURES (Continued)

FIRE FIGHTING PROCEDURES:

Wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus and full protective clothing.

FIRE AND EXPLOSION HAZARD:

None known.

SENSITIVITY TO MECHANICAL IMPACT:

Not sensitive.

SENSITIVITY TO STATIC DISCHARGE:

Not sensitive.

Revised

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Follow protective measures provided under Personal Protection in Section 8.

Evacuate unnecessary personnel and eliminate all sources of ignition.

ENVIRONMENTAL PRECAUTIONS:

Do not allow entry into sewers and waterways.

METHODS FOR CLEANING UP:

For small spills, soak up with absorbent material and place in properly labeled containers for disposal.

For large spills, dike and pump into properly labeled containers for reclamation or disposal.

Revised

7. HANDLING AND STORAGE

HANDLING:

Use with adequate ventilation.

Avoid breathing vapors.

Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the MSDS.

SPECIAL MIXING AND HANDLING INSTRUCTIONS:

Do not allow contact with materials as noted in Section 10.

7. HANDLING AND STORAGE (Continued)

ORIGINAL (Red)

STORAGE:

Keep container tightly closed and properly labeled.

Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas can be generated.

Revised

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Handle product in a well ventilated area.

If product is handled in an open system, the use of process enclosures, local exhaust ventilation, and/or other engineering controls should be considered to control airborne levels to below recommended exposure limits, or below acceptable levels where there are no limits.

PERSONAL PROTECTION

RESPIRATORY:

A NIOSH approved respirator with a dust, fume and mist filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure.

A respiratory protection program that meets 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant use of a respirator.

EYE/FACE:

Wear chemical safety goggles plus full face shield to protect against contact when appropriate (ANSI Z87.1).

SKIN:

Wear protective clothing to minimize skin contact.

Wear chemical resistant gloves such as rubber, neoprene or vinyl.

OTHER:

Discard leather items that cannot be decontaminated.

Emergency shower and eyewash facility should be in close proximity (ANSI Z358.1).

ORIGINAL (Red)

Revised

9. PHYSICAL AND CHEMICAL PROPERTIES

	Concentration, weight %				
Physical State: Liquid:	10	20	30	40	50
Boiling Pt @ 760 mm Hg, °C:	110	113	119	129	144
Freezing Pt °C:	-10	-32	0	15	12
Vapor Press., mm Hg @ 60°C:	135	110	76	46	13
Spec. Grav. @ 15.6°C:	1.11	1.22	1.33	1.43	1.53
Density, lb/gal @ 15.6 C:	9.27	10.20	11.11	11.97	12.76
Sol. in H20, % by Wt.:	. . . . . 100				
Vapor Density:	. . . . .Not applicable.				
Odor Threshold (ppm):	Not determined				
Evaporation Rate:	Not determined				
Coefficient Water/Oil Distribution:	Not applicable				
pH:	7.5% solution has pH 14.0				

Appearance and Odor: Clear liquid with no distinct odor

Revised

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:

X	STABLE		UNSTABLE

REACTS WITH:

X	AIR		OXIDIZERS	X	METALS
	WATER	X	ACIDS	X	OTHER
	HEAT		ALKALIS		NONE

HAZARDOUS POLYMERIZATION:

	OCCURS	X	WILL NOT OCCUR

COMMENTS:

Product is corrosive to tin, aluminum, zinc and alloys containing these metals and will react with these metals in powder form. Avoid contact with leather, wool, acids, organic halogen compounds, or organic nitro compounds. Hazardous carbon monoxide gas can form upon contact with reducing sugars, food and beverage products in enclosed spaces and can cause death. Follow appropriate tank entry procedures.

Prolonged contact with aluminum may produce flammable hydrogen gas.

HAZARDOUS DECOMPOSITION PRODUCTS:

None.

Revised

11. TOXICOLOGICAL INFORMATION

ORIGINAL (Red)

1310-73-2 Sodium hydroxide (Na(OH))

This substance is alkaline and corrosive. Minimize contact. The irritating and corrosive properties of this substance depend on its concentration. It is toxic by the oral route. It may cause burns and other effects to the mucous membranes, mouth and digestive tract. Its dermal toxicity has not been determined. It may cause burns that are not immediately noticed or painful. Inhalation of dust or vapors can cause airway effects including burns. This substance is irritating and corrosive to the eyes and skin.

The irritating and corrosive properties of this substance depend on its concentration. In general, serious injury is associated with products with a pH of 11.5 or higher.

For further information call or write the address shown on page 1 of the MSDS.

Revised

12. ECOLOGICAL INFORMATION

1310-73-2 Sodium hydroxide (Na(OH))

TOXICITY: This material is believed to be slightly toxic to aquatic life.

PERSISTENCE: This material is believed to be unlikely to persist in the environment.

BIOACCUMULATION: This material is believed to be unlikely to bioaccumulate.

For further information call or write the address shown on page 1 of the MSDS.

Revised

13. DISPOSAL CONSIDERATIONS

Dispose of all waste and contaminated equipment in accordance with all applicable federal, state and local health and environmental regulations.

Revised

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: Sodium Hydroxide, Solution

DOT HAZARD CLASS: 8

DOT IDENTIFICATION N0: UN1824

DOT PACKING GROUP: II

DOT HAZARDOUS SUBSTANCE: RQ 1,000 Lbs. (Sodium Hydroxide)

ORIGINAL (Rpd)

14. TRANSPORT INFORMATION (Continued)

DOT MARINE POLLUTANT(S): Not Applicable

ADDITIONAL DESCRIPTION REQUIREMENT: Not Applicable

Revised

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

TSCA:

All components of this product that are required to be on the TSCA inventory are listed on the inventory.

SARA/TITLE III HAZARD CATEGORIES:

If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR 370. Please consult those regulations for details.

Immediate(Acute) Health:	YES	Reactive Hazard	YES
Delayed(Chronic) Health:	NO	Sudden Release of Pressure	NO
Fire Hazard:	NO		

HMIS HAZARD RATINGS:

HEALTH HAZARD: 3 FIRE HAZARD: 0 REACTIVITY: 2

STATE REGULATIONS:

See Section 2. COMPOSITION/INFORMATION ON INGREDIENTS list legend for applicable state regulation.

Consult local laws for applicability.

INTERNATIONAL REGULATIONS:

Consult the regulations of the importing country.

CANADA:

WHMIS Hazard Class: D1B, D2B, E

ORIGINAL (Red)

16. OTHER INFORMATION

For additional non-emergency health, safety or environmental information telephone (972) 404-2076 or write to:

Occidental Chemical Corporation
Product Stewardship Department
5005 LBJ Freeway
P.O. Box 809050
Dallas, Texas 75380

MSDS LEGEND:

ACGIH = American Conference of Governmental Industrial Hygienists

CAS = Chemical Abstracts Service Registry Number

CEILING = Ceiling Limit (15 Minutes)

CEL = Corporate Exposure Limit

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit (OSHA)

STEL = Short Term Exposure Limit (15 Minutes)

TDG = Transportation of Dangerous Goods (Canada)

TLV = Threshold Limit Value (ACGIH)

TWA = Time Weighted Average (8 Hours)

WHMIS = Worker Hazardous Materials Information System (Canada)

* = See Section 3 Hazards Identification - Repeated Exposure(Chronic) Information

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, OR OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any federal, state or local laws, rules, regulations or ordinances.

This Material Safety Data Sheet (MSDS) covers the following materials:

- CAUSTIC SODA LIQUID (ALL GRADES)
- 50% CAUSTIC SODA DIAPHRAGM GRADE
- 18% CAUSTIC SODA RAYON GRADE
- 20% CAUSTIC SODA RAYON GRADE
- 25% CAUSTIC SODA RAYON GRADE
- 30% CAUSTIC SODA RAYON GRADE
- 50% CAUSTIC SODA RAYON GRADE
- 50% CAUSTIC SODA RAYON GRADE OS

ORIGINAL (Red)

16. OTHER INFORMATION (Continued)

- 50% CAUSTIC SODA MEMBRANE GRADE
- 18% CAUSTIC SODA - DIAPHRAGM
- 15% CAUSTIC SODA - DIAPHRAGM
- 30% CAUSTIC SODA - DIAPHRAGM
- 25% CAUSTIC SODA - DIAPHRAGM
- 20% CAUSTIC SODA - DIAPHRAGM
- 35% CAUSTIC SODA - DIAPHRAGM
- 50% CAUSTIC SODA - DIAPHRAGM
- 50% CAUSTIC SODA- DIAPHRAGM OS
- 50% CAUSTIC SODA - PURIFIED
- 50% CAUSTIC SODA - PURIFIED OS
- 18% CAUSTIC SODA - MEMBRANE
- CAUSTIC SODA LIQUID 70/30
- 50% CAUSTIC SODA - MEMBRANE
- 50% CAUSTIC SODA - MEMBRANE OS
- 25% CAUSTIC SODA - MEMBRANE
- 20% CAUSTIC SODA - MEMBRANE
- 40% CAUSTIC SODA - DIAPHRAGM
- 25% CAUSTIC SODA-MEMBRANE
- 6% CAUSTIC SODA-MEMBRANE
- 10% CAUSTIC SODA-DIAPHRAGM
- 25% CAUSTIC SODA-DIAPHRAGM
- MEMBRANE BLENDED
- 48% CAUSTIC SODA-MEMBRANE

Revised

17. WARNING LABEL INFORMATION

SIGNAL WORD:

DANGER

HAZARD WARNINGS:

MAY CAUSE BURNS TO THE EYES, SKIN, RESPIRATORY AND GASTROINTESTINAL TRACT.

MAY CAUSE PERMANENT EYE DAMAGE.

PRECAUTIONS:

Avoid contact with eyes, skin and clothing.

Avoid breathing dust, vapors or mist.

Use with adequate ventilation.

Wash thoroughly after handling; exposure can cause burns which are not immediately painful or visible.

Keep container tightly closed and properly labeled.

17. WARNING LABEL INFORMATION (Continued)

ORIGINAL (Red)

FIRST AID

EYES:

Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN:

Immediately flush contaminated areas with water. Remove contaminated clothing and footwear. Wash contaminated areas with plenty of soap and water. Wash clothing before reuse. Discard footwear which cannot be decontaminated. GET MEDICAL ATTENTION IMMEDIATELY.

INHALATION:

Remove to fresh air if safe to transport. Otherwise attempt to provide fresh air by ventilation. If breathing is difficult, have a trained person administer oxygen. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY (911 or emergency transport services).

INGESTION:

Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF SPILL OR LEAK:

Do not allow entry into sewers and waterways.

For small spills, soak up with absorbent material and place in properly labeled containers for disposal.

For large spills, dike and pump into properly labeled containers for reclamation or disposal.

FIRE:

Non-flammable / Non-combustible.

Use agents appropriate for surrounding fire.

HANDLING AND STORAGE:

Store in a cool, ventilated area away from incompatible materials (see Section 10).

DISPOSAL:

Dispose of all waste and contaminated equipment in accordance with all applicable federal, state and local health and environmental regulations.

17. WARNING LABEL INFORMATION (Continued)

INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This Product Contains:

CAS#	NAME
7732-18-5	Water
1310-73-2	Sodium hydroxide (Na(OH))
7647-14-5	Sodium chloride (NaCl)

HMIS RATING: HEALTH 3 FLAMMABILITY 0 REACTIVITY 2

LABEL NUMBER: 0701M32415

For Industrial Use Only

MATERIAL SAFETY DATA SHEET

ORIGINAL (Red)

AMMONIUM HYDROXIDE

Northeastern

NATIONAL

HAMLER H INDUSTRIES

HOWE BB BRAND

DISTRIBUTORS:

TANNER INDUSTRIES, INC.

DIVISIONS:

NATIONAL AMMONIA - NORTHEASTERN AMMONIA

HAMLER INDUSTRIES - BOWER AMMONIA & CHEMICAL

TACONY & VANKIRK STS., PHILADELPHIA, PA 19135

CORPORATE EMERGENCY TELEPHONE NUMBER: 215-535-7530 CHEMTREC (CMA) 800-424-9300

DESCRIPTION

CHEMICAL NAME. Ammonium Hydroxide Solution CAS REGISTRY NO. 1336-21-6
SYNONYMS. Aqua Ammonia
CHEMICAL FAMILY: Ammonia FORMULA: $NH_4OH + H_2O$ MOL. WT.. 35.05 (NH.OH)
COMPOSITION: 29.4% by weight of ammonia gas dissolved in water.

STATEMENT OF HEALTH HAZARD

HAZARD DESCRIPTION: Irritant and corrosive to skin, eye, respiratory tract and mucous membranes. May cause severe burns, eye and lung injuries. Skin and respiratory related diseases aggravated by exposure.
Not recognized by OSHA as a carcinogen.
Not listed in the National Toxicology Program annual report.
Not listed as a carcinogen by the International Agency for Research on Cancer.

EXPOSURE LIMITS. Vapor - OSHA - 35 ppm, 27 mg/m3 STEL, 15 minutes
25 ppm, 18 mg/m3 PEL
ACGIH - 25 ppm, 18 mg/m3 TLV, 8 hour TWA
35 ppm, 27 mg/m3 STEL, 15 minutes

EMERGENCY TREATMENT

EFFECTS OF OVEREXPOSURE: Skin: local irritation, burns, blister formation. Eye: burns, may lead to blindness. Ingestion: burning pain in mouth, throat, stomach, thorax, constriction of throat, coughing, followed by vomiting or diarrhea. Probable lethal ingestion dose is 3-4 ml. (1 ounce). Inhalation: irritation, headache coughing, severe lung congestion, breathing difficulty, convulsions, shock).

EMERGENCY AID: Skin: flush with copious amount of water while removing contaminated clothing, shoes. Do not rub, or apply ointment on affected area. Ingestion: if conscious, give large amount of water to drink. Refer immediately to physician. Eye: flush with copious amount of water for 15 min. Eyelids should be held apart and away from eyeball for thorough rinsing. Inhalation: remove to fresh air. Administer oxygen or artifical respiration if necessary. SEEK IMMEDIATE MEDICAL HELP.

NOTE TO PHYSICIAN: Eye injury may appear as delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Supportive treatment with necessary ventilatory actions, including oxygen, may warrant consideration.

PHYSICAL DATA

BOILING PT.: NH_3 vapors released on warming
VAPOR PRESSURE: @ 15.5°C: 420-475 mm Hg
SPECIFIC GRAVITY: 0.8974 at 60°F
PERCENT VOLATILE: 100% at 212°F
APPEARANCE AND ODOR: Colorless liquid and pungent odor

FREEZING PT.: -77.7°C (-108°F)
VAPOR DENSITY (Air=1): less than 1
SOLUBILITY IN WATER: Complete
EVAPORATION RATE (Water=1): Similar

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: None AUTOIGNITION TEMP.: Not applicable
FLAMMABLE LIMITS IN AIR: for evolved ammonia: LEL: 16% UEL: 25%
EXTINGUISHING MEDIA: Non-combustible

SPECIAL FIRE-FIGHTING PROCEDURES: Not considered a primary fire hazard, but care should be taken to avoid exposure to liquid product involved in fire. Wear splash-proof, gas-tight chemical goggles, respiratory protection, rubber gloves and clothing to avoid contact as needed. Cool fire-exposed containers.

UNUSUAL FIRE AND EXPLOSION HAZARDS: When heated, material will give off ammonia gas, a strong irritant to eye, respiratory tract, and moist skin. Closed containers exposed to extreme heat may develop pressure. Combustion of released ammonia may form nitrogen oxides.

Revision: April 1992

MATERIAL SAFETY DATA SHEET

ORIGINAL (Red)

AMMONIUM HYDROXIDE (Continued)

CHEMICAL REACTIVITY

STABILITY Stable at room temperature. Aqua ammonia will react exothermically with acids Releases ammonia vapor when heated

CONDITIONS TO AVOID Avoid mixing with sulfuric acid or other strong mineral acids, mixing with hypochlorites (chlorine bleach), other halogens, sodium hydroxide Avoid contact with galvanized surfaces, copper, brass, bronze, aluminum alloys, mercury, gold, silver; strong oxidizers. Avoid heating.

HAZARDOUS DECOMPOSITON PRODUCTS Ammonia decomposition to hydrogen and nitrogen gases above 450°C (842°F)

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN Wear respiratory protection and protective clothing; see PROTECTIVE EQUIPMENT Stop source if possible Stay upwind and use water spray to absorb the evolved gas. Dilute with large amount of water Contain spill by diking

WASTE DISPOSAL. Listed as hazardous substance under CWA (40 CFR 116 4 40 CFR 117 3 Reportable Quantity. Category C. 1000 #/454kg.) Comply with all regulations. Suitably diluted, product may be disposed of on agricultural land as fertilizer Keep spill from entering streams or lakes.

SPECIAL PROTECTION AND PROCEDURES

RESPIRATORY PROTECTION: MSHA/NIOSH approved respiratory protection with full facepiece for gas and vapor contaminants effective for ammonium hydroxide and able to be used for entry and escape in emergencies Refer to 29 CFR 1910 134 and ANSI: Z88.2 for requirements and selection.

VENTILATION. Local exhaust sufficient to keep ammonia gas to 25 ppm or less. Refer to 29 CRF 1910.134 and ANSI Z9 2 for requirements and selection

PROTECTIVE EQUIPMENT Splash-proof, gas-tight chemical safety goggles, rubber gloves and overshoes to prevent contact. Cotton work clothes recommended. Refer to 29 CRF 1910.132 to 1910.136 for requirements

SPECIAL PRECAUTIONS

HANDLING AND STORING. Keep in strong glass or plastic, tightly closed containers. Store in cool (26.7°C/80°F) and well-ventilated area.

WORKPLACE PROTECTIVE EQUIPMENT as discussed above should be near, but outside of aqua ammonia area. Eyewash and safety shower in immediate vicinity. See 29 CFR 1910.141 for workplace requirements.

DISPOSAL: Aqua ammonia is listed as a hazardous substance under FWPCA. See WASTE DISPOSAL. Classified as RCRA Hazardous waste due to corrosivity with designation D002 if disposed of in original form.

PERSONAL: Avoid unnecessary exposure. Use protective equipment as needed. Do not wear contact lenses.

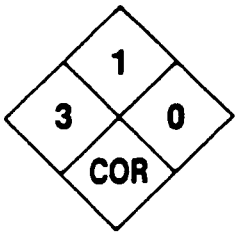
LABELING AND SHIPPING

HAZARD CLASS: 8 (Corrosive)
PROPER SHIPPING NAME: Ammonia Solutions (Ammonium Hydroxide, 8 (Corrosive), UN2672, PG III, RQ

PLACARD Corrosive

IDENTIFICATION NO: UN 2672

National Fire Protection Assoc. Hazard Rating:



Hazardous Materials Identification System Label:

ANHYDROUS AMMONIA	
HEALTH	3
FLAMMABILITY	1
REACTIVITY	0
PERSONAL PROTECTION	H

OTHER REGULATORY REQUIREMENTS

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Title III, Section 304, any environmental release of this chemical equal to or over the reportable quantity of 1000 lbs. must be reported promptly to the National Response Center, Washington, D.C. (1-800-424-8802). Any consumer product containing 5% or more ammonia requires a POISON label under FHSA (16 CFR 1500.129(1)).

EPA Hazard Catagories - Immediate: Yes; Delayed: No; Fire: No; Sudden Release: No; Reactive: No

MATERIAL SAFETY DATA SHEET	Ashland	ASHLAND CHEMICAL, INC. Subsidiary Of Ashland Oil, Inc P.O. BOX 2219 COLUMBUS, OHIO 43216 (614) 889-3333	24-HOUR Emergency Telephone 1(800) 274-5263 or 1(800) ASHLAND

001431

AQUA AMMONIA 26 DEG

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

****

Product Name: AQUA AMMONIA 26 DEG
CAS NUMBER: 1336-21-6

Data Sheet No: 0000661-006.000
Prepared: 01/29/90
Supersedes: 05/31/89

05 50 074 9469570-

WITCO CORPORATION
3300 WEST FOURTH ST
TRAINER PA 19061

PRODUCT: 3020500
INVOICE: 206647
INVOICE DATE: 12/17/92
TO: WITCO CORPORATION
% MONSEY
430 HUDSON RIVER ROAD
WATERFORD NY 12188

ATTN: PLANT MGR./SAFETY DIR.

SECTION I - PRODUCT IDENTIFICATION

General or Generic ID: ALKALI

DOT Hazard Classification: CORROSIVE MATERIAL (173.240)

SECTION II - COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS AND CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III SECTION 313 ARE IDENTIFIED IN THIS SECTION.
SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	% (by WT)	PEL	TLV	Note
AMMONIUM HYDROXIDE CAS #: 1336-21-6	61	35 PPM	25 PPM	(1)
WATER	35-40			

Notes:

(1) THE OSHA PEL OF 35 PPM FOR AMMONIA IS THE SHORT TERM EXPOSURE LIMIT (STEL) REFLECTING A 15-MINUTE TIME WEIGHTED AVERAGE. THE ACGIH SHORT TERM EXPOSURE LIMIT (STEL) IS ALSO 35 PPM. NIOSH RECOMMENDS A 50 PPM 5-MINUTE CEILING.

SECTION III - PHYSICAL DATA

Boiling Point	for PRODUCT	80.00 - 85.00 Deg F (26.66 - 29.44 Deg C) @ 760.00 mm Hg
Vapor Pressure	for PRODUCT	755.00 mm Hg @ 80.00 Deg F (26.66 Deg C)
Specific Vapor Density	AIR = 1	.6
Specific Gravity		.897 @ 60.00 Deg F (15.55 Deg C)
Percent Volatiles		100.00%
Evaporation Rate		SLOWER THAN ETHER
pH		13.6
Appearance		CLEAR, COLORLESS, PUNGENT ODOR
State		LIQUID
Form		HOMOG SOLN

SECTION IV - FIRE AND EXPLOSION INFORMATION

FLASH POINT NOT APPLICABLE

EXPLOSIVE LIMIT (PRODUCT) LOWER - 16.0% UPPER - 25.0%

EXTINGUISHING MEDIA: WATER FOG

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS:, AMMONIA

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE AND FULL BODY PROTECTION WHEN FIGHTING FIRES.

WATER MAY BE USED TO KEEP FIRE-EXPOSED CONTAINERS COOL UNTIL FIRE IS OUT.

NFPA CODES: HEALTH- 3 FLAMMABILITY- 1 REACTIVITY- 0

CLOSED CONTAINERS MAY RUPTURE OR EXPLODE DUE TO PRESSURE BUILD-UP WHEN EXPOSED TO EXTREME HEAT

SECTION V - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL 35 PPM

THRESHOLD LIMIT VALUE 25 PPM

CONTINUED ON PAGE: 2

SECTION V-HEALTH HAZARD DATA (Continued)

EFFECTS OF ACUTE OVEREXPOSURE:

EYES - CAN CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION; LIQUID CAN CAUSE SEVERE OR PERMANENT EYE DAMAGE.
SKIN - CAN CAUSE SEVERE IRRITATION AND EXCESSIVE OR PROLONGED CONTACT CAN RESULT IN BLISTERS AND BURNS.
BREATHING - CAUSES LUNG IRRITATION EFFECTS INCLUDING COUGH, DISCOMFORT, DIFFICULTY BREATHING, AND SHORTNESS OF BREATH. THESE INITIAL SYMPTOMS MAY BE FOLLOWED IN HOURS BY SEVERE SHORTNESS OF BREATH, WITH SEVERE EXPOSURES RESULTING IN PULMONARY EDEMA.
SWALLOWING - IRRITATING AND CORROSIVE TO MUCOUS MEMBRANES.OVEREXPOSURE CAN RESULT IN DEATH.

FIRST AID:

IF ON SKIN: IMMEDIATELY FLUSH EXPOSED AREA WITH WATER FOR AT LEAST 15 MINUTES, GET MEDICAL ATTENTION. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

REMOVE CONTAMINATED SHOES PROMPTLY. DISCARD SHOES SATURATED WITH THIS PRODUCT.

IF IN EYES: IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES, LIFTING UPPER AND LOWER LIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IF PHYSICIAN IS NOT IMMEDIATELY AVAILABLE, CONTINUE FLUSHING WITH WATER.

DO NOT USE CHEMICAL ANTIDOTE.

IF SWALLOWED: DO NOT INDUCE VOMITING. VOMITING WILL CAUSE FURTHER DAMAGE TO THE THROAT. DILUTE BY GIVING WATER. GIVE MILK OF MAGNESIA. KEEP WARM, QUIET. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL RESPIRATION. KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION, SKIN CONTACT

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, STRONG ACIDS, HYPOCHLORITES, STRONG ALKALIES, BRASS, SILVER, COPPER, ALKALI METALS, IRON, METALLIC MERCURY

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: ABSORB LIQUID ON VERMICULITE, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND TRANSFER TO HOOD.

FLUSH AREA WITH WATER.

LARGE SPILL: PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM AREA OF SPILL UNTIL CLEAN-UP HAS BEEN COMPLETED. STOP SPILL AT SOURCE, DIKE AREA OF SPILL TO PREVENT SPREADING, PUMP LIQUID TO SALVAGE TANK. REMAINING LIQUID MAY BE TAKEN UP ON SAND, CLAY, EARTH, FLOOR ABSORBENT, OR OTHER ABSORBENT MATERIAL AND SHOVELED INTO CONTAINERS.

WASTE DISPOSAL METHOD:

SMALL SPILL: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

LARGE SPILL: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF WORKPLACE EXPOSURE LIMIT(S) OF PRODUCT OR ANY COMPONENT IS EXCEEDED (SEE SECTION II), A NIOSH/MSHA APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS (NEGATIVE PRESSURE TYPE) UNDER SPECIFIED CONDITIONS (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NEOPRENE, NITRILE RUBBER, BUTYL RUBBER

EYE PROTECTION: CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED.SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

MATERIAL SAFETY DATA SHEET	Ashland	ASHLAND CHEMICAL, INC. Subsidiary of Ashland Oil, Inc. P.O. BOX 2219 COLUMBUS, OHIO 43216 (614) 889-3333	24-HOUR Emergency Telephone 1(800) 274-52[illegible] 1(800) ASHLAND

DEFINITIONS

This definition page is intended for use with Material Safety Data Sheets supplied by the Ashland Chemical Company. Recipients of these data sheets should consult the OSHA Safety and Health Standards (29 CFR 1910), particularly subpart G - Occupational Health and Environmental Control, and subpart I - Personal Protective Equipment, for general guidance on control of potential Occupational Health and Safety Hazards.

SECTION I
PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: Chemical family or product description.

DOT HAZARD CLASSIFICATION: Product meets DOT criteria for hazards listed.

SECTION II
COMPONENTS

Components are listed in this section if they present a physical or health hazard and are present at or above 1% in the mixture. If a component is identified as a CARCINOGEN by NTP, IARC, or OSHA as of the date on the MSDS, it will be listed and footnoted in this section when present at or above 0.1% in the product. Negative conclusions concerning carcinogenicity are not reported. Additional health information may be found in Section V. Components subject to the reporting requirements of Section 313 of SARA Title III are identified in the footnotes in this section, along with typical percentages. Other components may be listed if deemed appropriate.

Exposure recommendations are for components. OSHA Permissible Exposure Limits (PELS) and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) appear on the line with the component identification. Other recommendations appear as footnotes.

SECTION III
PHYSICAL DATA

BOILING POINT: Of product if known. The lowest value of the components is listed for mixtures.

VAPOR PRESSURE: Of product if known. The highest value of the components is listed for mixtures.

SPECIFIC VAPOR DENSITY: Compared to AIR = 1. If the Specific Vapor Density of a product is not known, the value is expressed as lighter or greater than air.

SPECIFIC GRAVITY: Compared to WATER = 1. If Specific Gravity of product is not known, the value is expressed as less than or greater than water.

pH: If applicable.

PERCENT VOLATILES: Percentage of material with initial boiling point below 425 degrees Fahrenheit and vapor pressure above 0.1mm Hg at 68 F.

EVAPORATION RATE: Indicated as faster or slower than ETHYL ETHER, unless otherwise stated.

SECTION IV
FIRE AND EXPLOSION DATA

FLASH POINT: Method identified.

EXPLOSION LIMITS: For product if known. The lowset value of the components is listed for mixtures.

HAZARDOUS DECOMPOSITION PRODUCTS: Known or expected hazardous products resulting from heating, burning or other reactions.

SECTION IV (cont.)

EXTINGUISHING MEDIA: Following National Fire Protection Association criteria.

FIREFIGHTING PROCEDURES: Minimum equipment to protect firefighters from toxic products of vaporization, combustion or decomposition in fire situations. Other firefighting hazards may also be indicated.

SPECIAL FIRE AND EXPLOSION HAZARDS: States hazards not covered by other sections.

NFPA CODES: Hazard ratings assigned by the National Fire Protection Association.

SECTION V
HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMIT: For product.

THRESHOLD LIMIT VALUE: For product.

EFFECTS OF ACUTE OVEREXPOSURE: Potential local and systemic effects due to single or short term overexposure to the eyes and skin or through inhalation or ingestion.

EFFECTS OF CHRONIC OVEREXPOSURE: Potential local and systemic effects due to repeated or long term overexposure to the eyes and skin or through inhalation or ingestion.

FIRST AID: Procedures to be followed when dealing with accidental overexposure.

PRIMARY ROUTE OF ENTRY: Based on properties and expected use.

SECTION VI
REACTIVITY DATA

HAZARDOUS POLYMERIZATION: Conditions to avoid to prevent hazardous polymerization resulting in a large release of energy.

STABILITY: Conditions to avoid to prevent hazardous or violent decomposition.

INCOMPATIBILITY: Materials and conditions to avoid to prevent hazardous reactions.

SECTION VII
SPILL OR LEAK PROCEDURES

Reasonable precautions to be taken and methods of containment, clean-up and disposal. Consult federal, state and local regulations for accepted procedures and any reporting or notification requirements.

SECTION VIII
PROTECTIVE EQUIPMENT TO BE USED

Protective equipment which may be needed when handling the product.

SECTION IX
SPECIAL PRECAUTIONS OR OTHER COMMENTS

Covers any relevant points not previously mentioned.

ADDITIONAL COMMENTS

Containers should be either reconditioned by CERTIFIED firms or properly disposed of by APPROVED firms. Disposal of containers should be in accordance with applicable laws and regulations. "EMPTY" drums should not be given to individuals. Serious accidents have resulted from the misuse of "EMPTIED" containers (drums,pails,etc.). Refer to Sections IV and IX.

ATTACHMENT G

EXXON COMPANY, U.S.A.
A DIVISION OF EXXON CORPORATION

HEXANE

Form No. OSHA-20
Supersedes issue of 8/1/77

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
MATERIAL SAFETY DATA SHEET

Code 214

8/10/79
Revised
ORIGINAL
DG-1P

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
EXXON COMPANY, U.S.A.	(713) 656-3424

ADDRESS (Number, Street, City, State and ZIP Code)
P. O. Box 2180 Houston, Texas 77001

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Petroleum Solvent	HEXANE
CHEMICAL FAMILY	FORMULA
Petroleum Hydrocarbon	Complex mixture of petroleum hydrocarbons, primarily C_6.

SECTION II HAZARDOUS INGREDIENTS

	%	TLV (UNITS)
SOLVENTS	100	100 ppm

The presence (approximately 30-35% of n-Hexane (normal Hexane) in this solvent mixture represents a distinct hazard of producing peripheral poly-neuropathy, a progressive disorder of the nervous system, which with sufficient high exposure has the potential of becoming irreversible. This disorder has been observed in individuals exposed repeatedly to high vapor concentrations (1000-1500 ppm) of n-Hexane over a period of several months. n-Hexane exposure should be controlled to keep the maximum level below 100 ppm.

SECTION III PHYSICAL DATA

BOILING RANGE IBP-Dry Pt. (149-157°F)	65-69°C	SPECIFIC GRAVITY (H_2O=1) 15.6°/15.6°C	0.68
VAPOR PRESSURE (mm Hg.) @ 25°C	180	PERCENT VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR@1)	3.0	EVAPORATION RATE (n - BUTYL ACETATE=1)	15.8
SOLUBILITY IN WATER	Negligible		

APPEARANCE AND ODOR
Water-white liquid. Mild, pleasant hydrocarbon odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE OR EXPLOSIVE LIMITS (PERCENT BY VOLUME IN AIR)	LOWER LIMIT	UPPER LIMIT
Tag Closed Cup <-18°C (< 0°F)		1.2%	6.9%

EXTINGUISHING MEDIA
Foam, dry chemical, CO_2, or water fog or spray.

SPECIAL FIRE FIGHTING PROCEDURES
Use air-supplied breathing equipment for enclosed areas.
Cool exposed containers with water spray. Avoid breathing vapor or fumes.

USUAL FIRE AND EXPLOSION HAZARDS
Do not store or mix with strong oxidants like liquid chlorine or concentrated oxygen.

FLAMMABLE LIQUID

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

100 ppm for 8 hour workday, 40 hour workweek.

EFFECTS OF OVEREXPOSURE

Acute: Inhalation of high vapor concentrations may have results ranging from dizziness and headaches to unconsciousness.

Chronic: See Section II. Prolonged or repeated liquid contact will dry and defat the skin leading to irritation and dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

If overcome by vapor, remove from exposure immediately; call a Physician. If breathing is irregular or stopped, start resuscitation, administer oxygen. If ingested, DO NOT induce vomiting; call a Physician. In case of skin contact, remove any contaminated clothing, and wash skin with soap and warm water. If splashed into the eyes, flush eyes with clear water for 15 minutes or until irritation subsides.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

Strong oxidants like: liquid chlorine, concentrated oxygen, sodium or calcium hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS

Fumes, smoke and carbon monoxide, in the case of incomplete combustion.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all ignition sources. Keep people aw
Recover free liquid. Add absorbent (sand, earth, sawdust, etc.) to spill area. Avoid breathing vapors. Ventilate confined spaces. Open all windows and doors. Keep petroleum products out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas.

WASTE DISPOSAL METHOD

Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved disposal site or facility. (Caution: See Section II).

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Use hydrocarbon vapor canister or supplied-air respiratory protection in confined or enclosed spaces if needed.

VENTILATION	LOCAL EXHAUST: Face velocity > 60 fpm	SPECIAL: Use only with adequate* ventilation.
	MECHANICAL *(General)*: Use explosion-proof equipment	OTHER: No smoking or open lights.

PROTECTIVE GLOVES Use chemical-resistant gloves, if needed to avoid repeated or prolonged skin contact.

EYE PROTECTION Use splash goggles or face shield when eye contact may occur.

OTHER PROTECTIVE EQUIPMENT Use chemical-resistant apron or other clothing if needed to avoid repeated or prolonged skin contact.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING

Keep containers closed when not in use. Do not handle or store near heat, sparks, flame or strong oxidants. Adequate* ventilation required.

* Adequate means equivalent to outdoors.

OTHER PRECAUTIONS Avoid breathing vapors. Avoid prolonged or repeated contact with skin. Remove contaminated clothing, launder before reuse. Remove contamined shoes and thoroughly dry before reuse. Wash skin thoroughly with soap and water after contact.

FOR ADDITIONAL INFORMATION ON HEALTH EFFECTS CONTACT:

Director of Industrial Hygiene
(713) 656-2443

FOR OTHER PRODUCT INFORMATION CONTACT:

Manager, Marketing Technical Services
(713) 656-4929

Olin

MATERIAL SAFETY DATA

OCEAN NETWORK EMERGENCY PHONE 1-800-OLIN-911

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SEC. I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT.

I. PRODUCT IDENTIFICATION

REVISION NO : 15
REVISION DATE : 2/05/90
PRODUCT CODE : CPE511211
FILE NUMBER : CPE00041.0001
PRODUCT NAME: POLY-SOLV(R) EM
SYNONYMS: Ethylene glycol monomethyl ether; 2-methoxy ethanol; methyl cellosolve
CHEMICAL FAMILY: Glycol ether
FORMULA: $CH_3OC_2H_4OH$ or $C_3O_2H_8$
DESCRIPTION: Solvent and deicer
OSHA HAZARD CLASSIFICATION: Combustible liquid, irritant, reproductive toxin, blood toxin, liver toxin, kidney toxin, lung toxin, skin and eye hazard, nervous system toxin

II. COMPONENT DATA

PRODUCT COMPOSITION:

CAS or CHEMICAL NAME: 2-Methoxy ethanol
CAS NUMBER: 109-86-4
PERCENTAGE RANGE: 95%-99.9%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA (PEL)		ACGIH (TLV)	
	ppm	mg/cubic meter	ppm	mg/cubic meter
TWA:	25-skin		5-skin	
CEILING:	None		None	
STEL:	None		None	

ORIGINAL (RED)

III. PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY. AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER.

STORAGE CONDITIONS: Store in a cool, dry, well-ventilated place, away from all sources of ignition.

DO NOT STORE AT TEMPERATURES ABOVE: 49 Deg.C (120 Deg.F)

PRODUCT STABILITY AND COMPATIBILITY

SHELF LIFE LIMITATIONS: 1 year minimum under proper storage conditions

INCOMPATIBLE MATERIALS FOR PACKAGING: Rubber (causes swelling and softening), aluminum (causes corrosion)

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT: See Incompatible Materials, Section VII.

IV. PHYSICAL DATA

APPEARANCE: Clear, colorless liquid with solvent odor.

FREEZING POINT: -86 Deg.C (-123 Deg.F)

BOILING POINT: 124.5 Deg.C (256.1 Deg.F)

DECOMPOSITION TEMPERATURE: 204-232 Deg.C (400-450 Deg.F)

SPECIFIC GRAVITY: 0.963 @ 25/25 Deg.C

BULK DENSITY: 0.9718 (g/cc)

pH @ 25 DEG. C: 5.0-7.0 (25% Aqueous solution)

VAPOR PRESSURE @ 25 DEG.C: 8.63 mmHg

SOLUBILITY IN WATER: Soluble in all proportions.

VOLATILES, PERCENT BY VOLUME: >99%

EVAPORATION RATE: No Data

VAPOR DENSITY: No Data

MOLECULAR WEIGHT: 76.10

ODOR: Solvent-like

COEFFICIENT OF OIL/WATER DISTRIBUTION: No Data

V. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:

RESPIRATORY PROTECTION: Wear a NIOSH/MSHA approved respirator if any exposure occurs.

VENTILATION: Use local exhaust ventilation to maintain levels to below the TLV.

SKIN PROTECTIVE EQUIPMENT: Wear gloves, boots, apron and a face shield with safety glasses. A full impermeable suit is recommended if exposure is possible to large portion of body.

EQUIPMENT SPECIFICATIONS:

RESPIRATOR TYPE: Supplied air

GLOVE TYPE: Impervious

BOOT TYPE: Impervious

APRON TYPE: Impervious

PROTECTIVE SUIT: Impervious

VI. FIRE AND EXPLOSION HAZARD INFORMATION

FLAMMABILITY DATA:
FLAMMABLE: No
COMBUSTIBLE: Yes
PYROPHORIC: No
FLASH POINT: 46 Deg.C (115 Deg.F) Test Method: CCC
AUTOIGNITION TEMPERATURE: 285 Deg.C (545 Deg.F)
FLAMMABLE LIMITS AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE (PERCENT VOLUME IN AIR): 2.5% LEL 14.0% UEL

NFPA RATINGS: Not Established

HMIS RATINGS:
Health: 2
Flammability: 2
Reactivity: 0

EXTINGUISHING MEDIA:
Alcohol foam, Carbon dioxide, Dry chemical, Water spray

FIRE FIGHTING TECHNIQUES AND COMMENTS:
Use water to cool containers exposed to fire. Contact with reactive metals, e.g., aluminum may result in the generation of flammable hydrogen gas. See Section XI for protective equipment for fire fighting.

VII. REACTIVITY INFORMATION

CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE:
TEMPERATURES ABOVE: No Data
MECHANICAL SHOCK OR IMPACT: No
ELECTRICAL (STATIC) DISCHARGE: May cause ignition.
HAZARDOUS POLYMERIZATION: Will not occur.
INCOMPATIBLE MATERIALS: Oxidizers
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide
OTHER CONDITIONS TO AVOID: High temperatures
SUMMARY OF REACTIVITY:
OXIDIZER: No
PYROPHORIC: No
ORGANIC PEROXIDE: No
WATER REACTIVE: No
CORROSIVE: No

[redacted] (ORIGINAL)

VIII. FIRST AID

EYES: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Call a physician at once.

SKIN: Immediately flush with water for 15 minutes. Wash the contaminated skin with soap and water. If irritation develops, call a physician. If clothing comes in contact with the product, the clothing should be laundered before re-use.

INGESTION: Immediately drink large quantities of water to dilute. Induce vomiting. Call a physician at once. DO NOT give anything by mouth if the person is unconscious or if having convulsions.

INHALATION: If person experiences nausea, headache or dizziness, person should stop work immediately and move to fresh air until these symptoms disappear. If breathing is difficult, administer oxygen, keep the person warm and at rest. Call a physician. In the event that an individual inhales enough vapor to lose consciousness, person should be moved to fresh air at once and a physician should be called immediately. If breathing has stopped, artificial respiration should be given immediately. In all cases, ensure adequate ventilation and provide respiratory protection before the person returns to work.

IX. TOXICOLOGY AND HEALTH INFORMATION

ROUTES OF ABSORPTION
Skin, Eyes, Inhalation, Ingestion

WARNING STATEMENTS AND WARNING PROPERTIES
MAY BE HARMFUL IF INHALED AND EXPOSED TO SKIN OR EYES.

HUMAN DOSE RESPONSE DATA
ODOR THRESHOLD: No data
IRRITATION THRESHOLD: No data
TOXIC DOSE AND EFFECT: No data
IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: No IDLH concentration

SIGNS, SYMPTOMS, AND EFFECTS OF EXPOSURE

INHALATION:

ACUTE: If inhaled, mild irritation may result to the throat, upper respiratory tract, and lungs. Any irritation would be transient with no permanent damage expected. Inhalation of high concentrations may produce narcosis and kidney injury characterized by cell damage and urinary excretion of blood and protein. A reduction of red and white blood cell count may also occur.

CHRONIC: Reduced fertility may occur as a result of testicular damage. This damage is primarily characterized by impairment of the testes to produce sperm. A decrease in red and white blood cell count may occur with anemia and reduced ability to fight infection. Liver, kidney, and lung damage may occur, but only at high concentrations. Fetal development may be affected with soft-tissue and skeletal malformations resulting from exposure during pregnancy.

SKIN:

ACUTE: Skin contact may cause irritation consisting of transient redness. This irritant effect would not result in permanent damage.

CHRONIC: Ethylene glycol monomethyl ether can be absorbed through the skin in toxic amounts. The potential effects would be similar to that encountered from inhalation exposure.

EYES:

Contact with the eyes would be expected to cause irritation consisting of reversible redness, swelling, and mucous discharge to the conjunctiva. No corneal involvement or visual impairment would be expected.

INGESTION:

ACUTE: If ingested, gastroenteritis may occur with nausea, vomiting, lethargy, and diarrhea.

CHRONIC: The potential toxicity from ingestion would be similar to that from inhalation.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
There are no medical conditions known to be aggravated by exposure.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY:
There are no chemicals known to enhance the toxicity of the product.

ANIMAL TOXICOLOGY

ACUTE TOXICITY:
Oral LD 50 = 4.9 g/kg (rats)
Inhalation LC 50 = 1480 ppm (mice, 7 hr. exposure)
Dermal LD 50 = 2.4 g/kg (rabbits)
Irritant to skin and eyes.

AQUATIC TOXICITY: No available data

CHRONIC TOXICITY: Repeated inhalation of ethylene glycol monomethyl ether by rats and rabbits at 30 to 300 ppm produced definite treatment related effects. The most notable effect was a general degeneration of the testes, specifically to the tissue involved in sperm production. Rabbits were clearly more sensitive to this effect than rats. No change was observed to female reproductive organs. Changes in the blood at the highest concentration revealed evidence of anemia and reduced white cell count, probably due to impaired ability of the bone marrow to produce cells. Atrophy of the thymus gland was seen in both species, primarily at the top concentration. Liver, kidney, and lung damage has been observed, but only at high dose levels.

DEVELOPMENTAL AND REPRODUCTIVE TOXICITY: Repeated inhalation of ethylene glycol monomethyl ether at a concentration of 300 ppm inhibits fertility in rats. This effect is the result impaired sperm production; no effect to reproductive capability of the female was noted. Exposure of rabbits to 50 ppm ethylene glycol monomethyl ether produced an increase in soft-tissue and skeletal malformations and a reduction in fetal weight to the offspring. Rats and mice showed no evidence of an effect to fetal development when exposed to this concentration. Mice, however, showed an effect to fetal development from oral exposure at 62 mg/kg.

CARCINOGENICITY: This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP, or EPA.

MUTAGENICITY: This product is not known or reported to be mutagenic.

X. TRANSPORTATION INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT DESCRIPTION FROM THE HAZARDOUS MATERIALS TABLE 49 CFR 172.101:
Ethylene Glycol Monomethyl Ether, COMBUSTIBLE LIQUID, UN 1188

REPORTABLE QUANTITY: Not Applicable (Per 49 CFR 172.101, Appendix)

The material described above is subject to the U.S. DOT HAZARDOUS MATERIALS REGULATIONS via the modes and packaging quantities indicated below with the letter "x":

MODE	PACKAGING QUANTITIES
_x_ Rail	_x_ Bulk ___ Non-Bulk
_x_ Motor	_x_ Bulk ___ Non-Bulk
_x_ Water	_x_ Bulk ___ Non-Bulk
_x_ Air	_x_ Bulk ___ Non-Bulk

The applicable packaging section in 49 CFR is 173.118a.

SPECIAL COMMENTS: Hazardous materials regulations do not apply to this material in packagings of 110 gallons or less capacity.

XI. SPILL AND LEAKAGE PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.

REPORTABLE QUANTITY: Not Applicable (As per 40 CFR 302.4)

SPILL MITIGATION PROCEDURES: Hazardous concentrations in air may be found in local spill area and immediately downwind. Remove all sources of ignition.

Air Release - Vapors may be suppressed by the use of a water fog. Contain all water for analysis and/or treatment before disposal.

Water Release - This material is lighter than water. This material is soluble in water. Divert flow to a dike or trenched area for further handling. Notify all downstream users of potential contamination.

Land Spill - Dike area to contain spill. Recover material if capable. If unable to recover absorb in sand, clay or a commercial non-flammable absorbent prior to disposal.

SPILL RESIDUES: Dispose of per guidelines under Section XII, WASTE DISPOSAL.

ORIGINAL (Red)

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE FIGHTING SITUATIONS:
Use normal fire fighting equipment as well as additional respiratory protection when a spill or fire involving this product occurs. You are recommended to use a full face, cartridge type, NIOSH/MSHA approved respirator.

Response to this material may require the use of a full encapsulated suit and self-contained breathing apparatus (SCBA).

Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to: boots, gloves (see below for compatible materials), hard hat, splash proof goggles, full face shield and impervious clothing, i.e., chemically impermeable suit.

Compatible materials for response to this material are:
Neoprene Butyl Rubber

XII. WASTE DISPOSAL

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following EPA hazardous waste number: D001.

As a hazardous liquid waste, it must be disposed of in accordance with local, state and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by incineration.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

XIII. ADDITIONAL REGULATORY STATUS INFORMATION

TOXIC SUBSTANCES CONTROL ACT:
This substance is listed on the Toxic Substances Control Act inventory.

SUPERFUND AMENDMENT AND REAUTHORIZATION ACT TITLE III:
HAZARD CATEGORIES, PER 40 CFR 370.2:
HEALTH: Immediate (Acute)
Delayed (Chronic)
PHYSICAL: Fire

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP A:
EXTREMELY HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:
None Established

SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:
This mixture or tradename product contains a toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372.
CHEMICALS LISTED ARE: 2-Methoxy ethanol

XIV. ADDITIONAL INFORMATION

No additional information.

XV. MAJOR REFERENCES

1. ACGIH Guide to Protective Clothing. Cincinnati, OH: American Conference of Government Industrial Hygienists, 1987.
2. ANSI Z88.2. Recommended Practice for Respiratory Protection. American National Standards Institute, New York, NY.
3. Baker, C. J., The Fire Fighter's Handbook of Hazardous Materials, 4th Ed., Indiana: Maltese Enterprises, Inc., 1984.
4. Bretherick, L., Handbook of Reactive Chemical Hazards, 3rd Ed., Boston, MA: Butterworths, 1985.
5. Casarett, L. and J. Doull, Eds., Toxicology: The Basic Science of Poisons, 3rd Ed., New York: Macmillan Publishing Co., Inc. 1986.
6. CERIS (Chemical Emergency Response Information System) On Line Database. Association of American Railroads.
7. Chemical Degradation and Permeation Database and Selection Guide for Resistant Protective Materials. Austin, TX.
8. Clayton, G. and F. Clayton, Eds., Patty's Industrial Hygiene and Toxicology, Vol. 2A-C 3rd Ed., New York: John Wiley & Sons, 1981-1982.
9. Code of Federal Regulations, Titles 21, 29, 40 and 49. Washington, DC: U.S. Government Printing Office.
10. Emergency Response Guide (D.O.T.). Washington, DC: U.S. Government Printing Office, 1987.
11. Fire Protection Guide on Hazardous Materials, 9th Ed., National Fire Protection Association, Batterymarch Park, Quincy, MA, 1986.
12. Gosselin, R., et al., Gosselin-Clinical Toxicology of Commercial Products, 5th Ed., Baltimore: Williams and Wilkins, 1984.
13. Hazardline, Occupational Health Services Inc., New York, NY.
14. IARC Monogram on the Evaluation of Carcinogenic Risk of Chemicals to Man., Geneva: World Health Organization, International Agency for Research on Cancer.
15. Lenga, R., The Sigma-Aldrich Library of Chemical Safety Data, 1st Ed., Milwaukee, WI: Sigma-Aldrich Corporation, 1985.

16. Lewis, R. and D. Sweet, Eds., Registry of Toxic Effects of Chemical Substances, 1985-1986, Washington, DC: U.S. Government Printing Office, 1987.
17. Medline, U.S. National Library of Medicine, Bethesda, MD.
18. NIOSH Pocket Guide to Chemical Hazards. Washington, DC: U.S. Government Printing Office, 1985.
19. Olin Respiratory Protection Manual.
20. Sax, N. Irving, Dangerous Properties of Hazardous Materials 6th Ed., New York: Van Nostrand Reinhold Company, 1984.
21. Threshold Limit Values and Biological Exposure Indices for 1988-89. Cincinnati, OH: American Conference of Government Industrial Hygienists, 1987.
22. Toxic Substances Control Act Inventory, Washington, DC: U.S. Government Printing Office, 1986.
23. Cook, R. R. et al., November/December 1982. A Cross-Sectional Study of Ethylene Glycol Monomethyl Ether Process Employees. Archives of Environmental Health, Vol. 37, No. 6., 346-351.
24. Doe, J. E. et al., 1983. Comparative Aspects of the Reproductive Toxicology by Inhalation in Rats of Ethylene Glycol Monomethyl Ether and Propylene Glycol Monomethyl Ether. Toxicology and Applied Pharmacology, 69, 43-47.
25. Foster, P. et al., 1983. Testicular Toxicity of Ethylene Glycol Monomethyl and Monoethyl Ethers in the Rat. Toxicology and Applied Pharmacology, 69, 385-399.
26. Hanley, Jr., T. R. et al., 1984. Comparison of the Teratogenic Potential of Inhaled Ethylene Glycol Monomethyl Ether in Rats, Mice, and Rabbits. Toxicology and Applied Pharmacology, 75, 409-422.
27. Horton, V. L. et al., 1985. Developmental Phase-Specific and Dose-Related Teratogenic Effects of Ethylene Glycol Monomethyl Ether in CD-1 Mice. Toxicology and Applied Pharmacology; 80, 108-118.
28. McGregor, D. B. et al., 1983. Genetic Effects of 2-Methoxyethanol and Bis(2-methoxyethyl)ether. Toxicology and Applied Pharmacology, 70, 303-316. 29. Miller, R. R. et al., 1983. Ethylene Glycol Monomethyl Ether. I. Subchronic Vapor Inhalation Study with Rats and Rabbits. Fundam. Appl. Toxicol., 3:49-54.
30. Nagano, K. et al., 1981. Embryotoxic Effects of Ethylene Glycol Monomethyl Ether in Mice. Toxicology, 20, 335-343.
31. Rao, K. S. et al., 1983. Ethylene Glycol Monomethyl Ether. II. Reproductive and Dominant Lethal Studies in Rats. Fundam. Appl. Toxicol., 3:80-85.
32. Eastman Chemical Products, Inc. Summary of Toxicity Data on Ektasolve EM Solvent. August, 1981. Kingsport, Tennessee. MSDS 6550-3 and MSDS 6550-4.
33. Eastman Kodak Company. Material Safety Data Sheet on EKTASOLVE EM Solvent. August, 1981. Kingsport, Tennessee. MSDS-6550-1.
34. Hazard Evaluation System and Information Service. Hazard Alert #2 on Glycol Ethers (Cellosolve* Solvents). Berkeley, California.

35. Inversek Research International Limited. Individual Compound Report on 2-Methoxyethanol - Tier II Mutagenic Screening of 13 NIOSH Priority Compounds. November 1, 1980. Musselburgh, Scotland. Report Number 22. Contract No. 210-78-0026.

36. MB Research Laboratories, Inc. Acute Dermal Toxicity of Polysolv EM in Rabbits. April 3, 1976. Spinnerstown, Pennsylvania. Project Number MB 75-989.

37. MB Research Laboratories, Inc. Report on oral LD 50 on Polysolv EM in Rats. April 3, 1976. Spinnerstown, Pennsylvania. Project Number MB 75-989.

38. Olin Corporation. Material Safety Data Sheet on POLY-SOLV EM. May 13, 1988. Stamford, Connecticut. MSDS File 336.

39. Olin Corporation. Product Label on POLY-SOLV EM. Stamford, Connecticut. PSEM-A1 SL-286.

40. Olin Corporation. Product Data Sheet on POLY-SOLV MONOETHYLENE AND DIETHYLENE GLYCOL ETHER SOLVENTS. Stamford, Connecticut. 724-005R3.

41. Olin Corporation. Internal Standard on Ethylene glycol monoethyl ether. October 12, 1982.

42. Union Carbide Corporation. Methyl CELLOSOLVE/Methyl CELLOSOLVE Acetate. Health Effects Overview. February 1, 1987. Danbury, Connecticut.

43. Toxic and Hazardous Substances Control; 2-Methoxyethanol, 2-Ethoxyethanol and Their Acetates; Referral for Additional Action. Federal Register, Vol. 51, No. 97, Tuesday, May 20,1986, Notices. 18488.

ORIGINAL (Red)

THE INFORMATION IN THIS MATERIAL SAFETY SHEET SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. OLIN BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MATERIAL SAFETY DATA SHEET IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT OLIN AT THE PHONE NUMBER LISTED BELOW TO MAKE CERTAIN THAT THIS SHEET IS CURRENT.

OLIN MSDS CONTROL GROUP
Olin Corporation
120 Long Ridge Road
Stamford, CT 06904

Phone Number: (203) 356-3449

OLIN CORPORATION SUBSIDIARIES AND AFFILIATED ENTITIES: ASAHI-OLIN LTD., BRIDGEPORT BRASS CORPORATION, INDY ELECTRONICS, INC., OLIN CHLORATE CORPORATION, OLIN FABRICATED METAL PRODUCTS INC., OLIN HUNT SPECIALTY PRODUCTS INC., OLIN ELECTRONICS TECHNOLOGY, OLIN MESA CORP., OLIN SPECIALTY METALS CORPORATION, PACIFIC ELECTRO DYNAMICS, INC., PHYSICS INTERNATIONAL COMPANY, ROCKET RESEARCH COMPANY.

Toxicology Update — Glycol Ethers and Acetates

ORIGINAL (Red)

OSHA Advance Notice of Proposed Rulemaking

On April 2, 1987, the Occupational Safety and Health Administration (OSHA) published its Advanced Notice of Proposed Rulemaking (ANPR) with respect to reducing occupational exposure to ethylene glycol methyl ether and its acetate (EM/EMA) and ethylene glycol ethyl ether and its acetate (EE/EEA). This ANPR follows OSHA's review of available information indicating EM/EMA and EE/EEA cause adverse reproductive, developmental and hematologic effects in animals. In addition, this ANPR sets forth the possibility of OSHA extending rulemaking to other glycol ethers which have metabolic pathways similar to EM/EMA and EE/EEA. Metabolic studies on the ethylene based glycol ethers indicate that the toxic metabolite is the corresponding alkoxy acetic acid (EM - methoxy acetic acid; EE - ethoxyacetic acid). OSHA's concern appears to be twofold: (1) that many glycol ethers and glycol ether derivatives have not been tested and (2) that end users could reformulate from EM/EMA or EE/EEA to products which are potentially toxic. It should be noted that extensive published toxicological research[1] with the glycol ethers (in the United States, Europe and Japan) has shown a marked difference between the ethylene based ethers and the commercially available propylene based ethers. Despite the similarities in chemical structure, the type of toxicity seen in the ethylene based ethers has not been reported for the propylene based ethers. The propylene based ethers have not induced any toxicity to rapidly dividing cell systems. There is no evidence of embryotoxicity, fetotoxicity, teratogenicity or reproductive toxicity in general being induced by exposure to propylene glycol methyl ether (PM) even at 3000 ppm. The marked difference in toxicity between the EO based series and the propylene based series is most likely due to different metabolic pathways. Propylene glycol ethers are degraded in the body through a microsomal enzyme system to metabolites such as propylene glycol which are relatively innocuous. This bulletin is meant to summarize and explain the action OSHA has taken. For more information please refer to the Federal Register (Vol. 52 No. 63 pages 10586 to 10593), product MSDS, or our toxicity bulletin.

Public Discussion

The OSHA ANPR summarizes information currently available, including chemical properties, product and use, standards, history, health effects, risk assessment, and occupational control measures. The purpose of the ANPR is to allow interested parties to submit comments, data, or additional information to OSHA on the issues involved in reducing occupational exposure to these four chemicals.

Health Effect Findings

OSHA has determined that studies on ethylene glycol ethers uniformly show developmental toxicity and testicular damage as well as adverse hematologic and behavioral effects in offspring. The table below summarizes OSHA's review of these studies.

The OSHA publication noted that the adverse effects in animals have been verified by two human studies[4]: (1) a cross section of men working in EM production

Inhalation Toxicity Summary[2]

Organ System	No Observable Effect Level (NOEL) ppm (Species) EM/EMA	EE/EEA
Testicular	30 (rabbits)/100 (rats)	100 (rabbits)/400 (rats)
Teratogenicity	10 (mice, rats, rabbits)	50 (rabbits, rats)
Maternal Toxicity	300 (rats)	100 (rats)/175 (rabbits)
Fetotoxic	3 (rabbits)/10 (mice, rats)	50 (rabbits, rats)
Hematologic (blood)[3]	100 (rabbits)	50 (rats, rabbits)

ARCO Chemical Company
Division of AtlanticRichfieldCompany

**Environmental, Health & Safety Dept.,
3801 West Chester Pike,
Newtown Square, PA 19073**

exhibited decreases in testicular size vs. control and (2) workers exposed to EM (from nondetectable to 33.8 ppm) in metal coating exhibited a decrease in sperm count vs. control.

Absorption and Metabolism

Ethylene glycol ethers are rapidly absorbed via oral, dermal, or inhalation exposure routes. Studies on excised human skin show extremely rapid absorption of EM, EE and EEA.

Ethylene based glycol ethers are metabolized through an alcohol dehydrogenase to form an alkoxyacetic acid; i.e., EM metabolizes to methoxyacetic acid and EE metabolizes to ethoxyacetic acid. Current studies indicate that this metabolite, alkoxyacetic acid, is the ultimate toxin. The acetate esters, EMA and EEA, are also metabolized to the same alkoyxacetic acid as their parent ethylene glycol ether.

Scope of Regulation

OSHA is considering the possibility of expanding the scope of its rulemaking beyond these four chemicals (EM/EMA and EE/EEA) to cover other higher glycol ethers that have similar metabolic pathways. As was previously noted, the ethylene based glycol ethers are metabolized through an alcohol dehydrogenase to form the toxic metabolite - alkoxyacetic acid - while the propylene based ethers are metabolized in the body through the microsomal enzyme system to metabolites, such as propylene glycol, which are relatively innocuous.

OSHA noted that preliminary NIOSH studies suggest that exposure to higher order ethylene glycol ethers may present reproductive risks similar to those for the mono ethylene glycol ethers.[5]

Request for Comments

The public is requested to submit information to OSHA concerning health effects, permissible exposure limits, production and control systems, substitution and availability, protective equipment, and exposure and monitoring. Key areas of interest appear to include: (1) availability of risk assessment models to supplement EPA's proposed risk assessment methodology, (2) whether OSHA should include other ethylene glycol ethers on the scope of its rulemaking, (3) whether OSHA should set four separate PELs or one PEL for all four chemicals (based on hazards of most toxic chemical, EM, (4) extent of workplace exposure, and (5) the economic consequences of engineering controls. Comments must be submitted to OSHA by July 31, 1987.

References

[1] Toxicology bulletins available from ARCO Chemical:

- o OSHA Announcement EM/EMA and EE/EEA (December 1986)
- o Summary Update (November 1986)
- o Three EPA Publications (September 1986)
- o Update (March 1986)
- o Letter - Beta Isomer PMA (June 1985)
- o Update - ANPR on DB/DB Acetate (January 1985)
- o Summary Bulletin - E and P Series (December 1984)
- o Update - ANPR on EM/EMA and EE/EEA (January 1984)
- o Update - NIOSH Symposium (September 1983)

[2] Studies indicate that glycol ether acetates are rapidly metabolized to their corresponding glycol ether.

[3] Adverse hematologic effects observed, including hemolysis, bone marrow depression, and immunosuppression, have resulted from exposures similar to those producing reproductive or developmental effects.

[4] (1) Cook R.R. et al, "A Cross-Sectional Study of Ethylene Glycol Monomethyl Ether Process Employees" Arch. Envr. Health (1982) 37 (6): 346-51.

(2) NIOSH, Ratcliffe J. et al, Health hazard evaluation determination report no. 84-415-1688, Precision Castparts Corporation, Portland, Oregon (1986) Cincinnati: U.S. Dept. of Health and Human Services.

[5] George et al (J.D. George, C.J. Price, M.C. Marr and C.A. Kimmel, Teratology, June 1985, Abst. #P43) reported that triethylene glycol dimethyl ether did induce adverse effects on fetal growth as well as birth defects at levels that showed no signs of maternal toxicity. Hardin et al, (B.D. Hardin, P.T. Good and J.R. Burg, Teratology, June 1985, Abst. #P46) found diethylene glycol methyl ether (DM) induced skeletal and cardiovascular defects. Similarly, Price, et al, (C.J. Price, J.D. George, M.C. Marr and C.A. Kimmel, Teratology, June 1985, Abst. #P57) reported malformations induced by both diethylene glycol dimethyl ether and triethylene glycol dimethyl ether.

ATTACHMENT I

ORIGINAL (Red)

MATERIAL SAFETY DATA SHEET

Ashland

Date Prepared: 01/26/98
Date Printed: 11/04/00
MSDS No: 999.0001444-008.006

ISOPROPANOL 99%

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: ISOPROPANOL 99%
Product Code: 3507000
General or Generic ID: ALCOHOL

Company
Ashland
Ashland Distribution Co. &
Ashland Specialty Chemical Co.
P. O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:
1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:
1-800-325-3751

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
ISOPROPANOL	67-63-0	100.0

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
Can cause eye irritation. Symptoms include stinging, tearing, redness, and swelling of eyes.

Skin
May cause mild skin irritation. Prolonged or repeated contact may dry the skin. Symptoms may include redness, burning, drying and cracking of skin, and skin burns. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Swallowing
Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

Inhalation
Breathing of vapor or mist is possible. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms usually occur at air concentrations higher than the recommended exposure limits (See Section 8).

Symptoms of Exposure
Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), low blood pressure, mild, temporary changes in the liver, effects on heart rate, respiratory depression (slowing of the breathing rate), loss of coordination, confusion, lung edema (fluid buildup in the lung tissue), kidney damage, coma.

Continued on next page

ORIGINAL (Red)

Target Organ Effects
Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: mild, reversible liver effects

Developmental Information
This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain.

Cancer Information
Based on the available information, this material cannot be classified with regard to carcinogenicity. This material is not listed as a carcinogen by the International Agency for Research on Cancer, the National Toxicology Program, or the Occupational Safety and Health Administration.

Other Health Effects
No data

Primary Route(s) of Entry
Inhalation, Skin absorption, Skin contact, Eye contact.

4. FIRST AID MEASURES

Eyes
If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin
Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Swallowing
Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation
If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.

Note to Physicians
Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin, lung (for example, asthma-like conditions), kidney.

5. FIRE FIGHTING MEASURES

Flash Point
53.0 F (11.6 C) TCC

Continued on next page

ORIGINAL (Red)

Explosive Limit
(for product) Lower 2.0 Upper 12.0 %

Autoignition Temperature
750.0 F (398.8 C)

Hazardous Products of Combustion
May form: carbon dioxide and carbon monoxide.

Fire and Explosion Hazards
Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electric motors, static discharge, or other ignition sources at locations distant from material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.

Extinguishing Media
alcohol foam, carbon dioxide, dry chemical.

Fire Fighting Instructions
Water may be ineffective. Water may be used to keep fire-exposed containers cool until fire is out. Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.

NFPA Rating
Health - 1, Flammability - 3, Reactivity - 0

6. ACCIDENTAL RELEASE MEASURES

Small Spill
Absorb liquid on vermiculite, floor absorbent or other absorbent material.

Large Spill
Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source. Prevent from entering drains, sewers, streams or other bodies of water. Prevent from spreading. If runoff occurs, notify authorities as required. Pump or vacuum transfer spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent, soil and other materials to containers for disposal. Per good environmental management practices, prevent run-off to sewers, streams and other bodies of water. Stop spill at the source. Cover sewer grates and dike the spill. Absorb spilled material on to absorbents. Shovel materials into container. Close container tightly and dispose of properly.

7. HANDLING AND STORAGE

Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. All five-gallon pails and larger metal containers, including tank cars and tank trucks, should be grounded and/or bonded when material is transferred. Warning. Sudden release of hot organic chemical vapors or mists from process equipment operating at

Continued on next page

elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection
Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.

Skin Protection
Wear resistant gloves (consult your safety equipment supplier)., To prevent repeated or prolonged skin contact, wear impervious clothing and boots..

Respiratory Protections
If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.

Engineering Controls
Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

Exposure Guidelines
Component

ISOPROPANOL (67-63-0)
OSHA PEL 400.000 ppm - TWA
OSHA VPEL 400.000 ppm - TWA
OSHA VPEL 500.000 ppm - STEL
ACGIH TLV 400.000 ppm - TWA
ACGIH TLV 500.000 ppm - STEL

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point
(for product) 180.0 F (82.2 C) @ 760 mmHg

Vapor Pressure
(for product) 33.000 mmHg @ 68.00 F

Specific Vapor Density
2.070 @ AIR=1

Continued on next page

Specific Gravity
.789 @ 60.00 F

Liquid Density
6.580 lbs/gal @ 60.00 F
.789 kg/l @ 15.60 C

Percent Volatiles
100.0 %

Volatile Organic Compounds (VOC)
100.000 %
789.000 g/l
6.580 lbs/gal

Evaporation Rate
7.70 (ETHYL ETHER)

Appearance
TRANSPARENT

State
LIQUID

Physical Form
NEAT

Color
CLEAR, PT-CO COLOR 10 MAX

Odor
SLIGHT ETHANOL/ACETONE-LIKE

pH
No data

Viscosity
2.4 cps

Freezing Point
-128.0 F (-88.8 C)

Molecular Weight
60.1

Solubility in Water
100%

Octanol/Water Partitiion Coefficient
1.400

Bulk Density
.880 lbs/ft3

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Continued on next page

ORIGINAL (Red)

Hazardous Decomposition
May form: carbon dioxide and carbon monoxide.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: acetaldehyde, acids, chlorine, ethylene oxide, isocyanates strong oxidizing agents, Do not use with aluminum equipment at temperatures above 120 degrees F..

11. TOXICOLOGICAL INFORMATION

No data

12. ECOLOGICAL INFORMATION

No data

13. DISPOSAL CONSIDERATION

Waste Management Information
Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-637-7922.

14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101
DOT Description:
ISOPROPANOL,3,UN1219,II

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
None

RQ (Reportable Quantity) - 49 CFR 172.101
Not applicable

15. REGULATORY INFORMATION

US Federal Regulations
TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed.

Continued on next page

ORIGINAL (Red)

CERCLA RQ - 40 CFR 302.4(a)
None listed

SARA 302 Components - 40 CFR 355 Appendix A
None

Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed(X) Fire(X) Reactive( ) Sudden Release of Pressure( )

SARA 313 Components - 40 CFR 372.65
None

OSHA Process Safety Management 29 CFR 1910
None listed

EPA Accidental Release Prevention 40 CFR 68
None listed

International Regulations

Inventory Status
ACOIN (AUSTRALIA) The intentional ingredients of this product are listed.
DSL (CANADA) The intentional ingredients of this product are listed.
ECL (SOUTH KOREA) The intentional ingredients of this product are listed.
EINECS (EUROPE) The intentional ingredients of this product are listed.
ENCS (JAPAN) The intentional ingredients of this product are listed.

State and Local Regulations

California Proposition 65
None

New Jersey RTK Label Information

ISOPROPYL ALCOHOL	67-63-0

Pennsylvania RTK Label Information

2-PROPANOL	67-63-0

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

ATTACHMENT J

Chemical Hazard Data

EXXON CHEMICALS

PRODUCT NAME		REVISION	DATE	PAGE
Barium Hydroxide Monohydrate	HDH-H-00007	0	Feb.'76	1

I. HEALTH INFORMATION AND PROTECTION

FIRST AID:

Inhalation: If overcome by dust, remove immediately from exposure and call a physician; administer artificial respiration if breathing is irregular or has stopped.

Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

Skin Contact: Immediately flush with water; use soap if available. Remove contaminated clothing. Call a physician.

Ingestion: No hazard by this route in normal industrial use.

NATURE OF HAZARD:

Inhalation: High order of toxicity.

Eye Contact: Corrosive. Will injure eye tissue.

Skin Contact: Corrosive. Will injure skin tissue.

Ingestion: Moderate order of toxicity.

THRESHOLD LIMIT VALUE (TLV): 0.5 mg/m^3 for soluble barium compounds, ACGIH, 1975.

Toxicity Data

Inhalation: Mice, rats and guinea pigs: 6-hour exposure to dust at ambient temperature; nominal concentration of 2.70 mg/l air: 10 of 10 mice, 7 of 10 rats and 1 of 10 guinea pigs died; signs of toxicity: dyspnea, sneezing and salivation; no gross pathological alterations.

Eye Contact: 100 mg undiluted into 6 non-irrigated rabbit eyes; corrosion of cornea, iris and conjunctiva within one hour after instillation.

Skin Contact: Rabbit dermal LD_{50} greater than 200 mg/kg; corrosion of skin, subcutaneous tissue and skeletal muscles at site of contact.

Ingestion: Rat oral LD_{50} = 218 mg/kg; signs of toxicity: inactivity, labored breathing, muscular weakness, ataxia, ruffed fur, ptosis, diarrhea and prostration.

SPECIAL PRECAUTIONS:

Wear suitable protective equipment to prevent eye and skin contact. Keep airborne concentrations below 0.5 mg/m^3.

ORIGINAL (Red)

II. FIRE AND EXPLOSION HAZARD DATA

ASH POINT (METHOD)	FLAMMABLE LIMITS, VOL. % IN AIR
Not applicable	Not applicable
	AUTOIGNITION TEMPERATURE
	Not applicable

RE AND EXPLOSION HAZARD, GENERAL

e No hazard. Material will not burn.

III. FIRE FIGHTING

RE FIGHTING PROCEDURES

Use water spray to cool fire exposed surfaces and to protect personnel.

CIAL PRECAUTIONS

See Sections I & VI.

IV. SPILL CONTROL PROCEDURE

D SPILL

Keep public away. Shut off source if possible to do so without hazard. Advise police if substance has entered a watercourse or sewer or has contaminated soil or vegetation.
Sweep up spilled material and place in containers for recycle or disposal.
Avoid breathing dust during cleanup operations.
Consult an expert on disposal of recovered material and insure conformity to local disposal regulations.
See Sections I & VI.

ER SPILL

Notify Port Authority and keep public away. Shut off source if possible to do so without hazard. Confine if possible.
Material will sink. No immediate action - consult an expert.
Consult an expert on disposal of recovered material and insure conformity to local disposal regulations.
See Sections I & VI.

PRODUCT NAME	REVISION	DATE
Barium Hydroxide Monohydrate	0	Feb. '76

ORIGINAL (Rev.)

V. PHYSICAL AND CHEMICAL PROPERTIES

DESCRIPTION: White crystalline solid	VAPOR PRESSURE: Not applicable
	SOLUBILITY IN WATER, WT. %: 3.74 @ 20°C (68°F)
CHEMICAL NAME: Barium Hydroxide Monohydrate	IS MATERIAL HYGROSCOPIC?: No
CHEMICAL FORMULA: $Ba(OH)_2H_2O$	MOLECULAR WEIGHT: 189
SP. GR. OF LIQUID: Not applicable	SP. VISCOSITY OF LIQUID, H_2O = 1: Not applicable - solid
SP. GR. OF VAPOR AT 1 ATM, AIR = 1: Not applicable	COEFFICIENT OF THERMAL EXPANSION OF LIQUID: Not applicable
FREEZING POINT: Not available	EVAPORATION RATE (n-BuAc=1): Not applicable
BOILING POINT: Not applicable	HEAT OF VAPORIZATION AT BOILING POINT AND 1 ATM: Not applicable

VI. REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID: Not applicable
	STABLE	X	

MATERIALS/CONDITIONS TO AVOID (INCOMPATIBILITY)
Inorganic acids, organic acids, halogenated compounds, aldehydes, ketones, esters, monomers, and polymerizable esters, alkylene oxides, cyanohydrins, nitriles, halogens, phosphorus, acid anhydrides.

HAZARDOUS DECOMPOSITION PRODUCTS
None

HAZARDOUS COMBUSTION PRODUCTS
None

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID: Not applicable
	WILL NOT OCCUR	X	

VII. HAZARD LABELING INFORMATION

UN HAZARD CLASS NUMBER: 6.1.0	US DOT CLASSIFICATION: Corrosive Material
US DOT HAZARD INFORMATION NUMBER:	EEC DANGEROUS SUBSTANCE CLASSIFICATION: Xn
ADR CLASS NUMBER: IVa, Marginal 2401, 71°	EEC SPECIAL RISKS AND SAFETY ADVICE: R: 54 S: 21-31-51-91

ORIGINAL (Red)

VIII. TRANSPORTATION AND STORAGE

USUAL SHIPPING CONTAINERS	ELECTROSTATIC ACCUMULATION HAZARD?
Tote bins, kegs, sacks	No (See Note 1, Section X)
	STORAGE/TRANSPORT PRESSURE: Atmospheric
STORAGE/TRANSPORT TEMPERATURE: Ambient	LOADING/UNLOADING TEMPERATURE: Ambient
CEFIC TREMCARD NUMBER: Not issued	VISCOSITY AT LOADING/UNLOADING TEMPERATURE: Not applicable - solid
ISCG SUBCHAPTER CLASSIFICATION: Not classified	

IX. HANDLING AND STORAGE MATERIALS AND COATINGS

SUITABLE	UNSUITABLE
Mild Steel Stainless Steel	

X. NOTES

1) Although the material is not a static accumulator all handling equipment should be electrically grounded.

FOR ADDITIONAL INFORMATION, CONTACT:

ORIGINAL (Red)

Barium Hydroxide Monohydrate

DANGER! CAUSES BURNS
Do not get in eyes, on skin, on clothing.
Do not breathe dust.
Wear goggles, rubber gloves, and protective clothing when handling.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep airborne concentrations below 0.5 mg/M³.

FIRST AID:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse.

IN CASE OF SPILL OR LEAK:
Carefully sweep up material and place in a container.
Observe above precautions.

EXXON CHEMICALS

EXXON CHEMICAL COMPANY U.S.A.
An operating division of EXXON CHEMICAL COMPANY, a division of EXXON CORPORATION
Houston, Texas 77001

Made in U.S.A.

cc: HSG VJC Original → AHM-

EXXON CHEMICAL COMPANY U.S.A.

P. O Box 636, Linden, New Jersey 07036

BAYWAY CHEMICAL PLANT
G. L. OTIS, JR.
Manager

March 29, 1976

DOT Hazardous Material -
Barium Monohydrate

Mr. A. H. Melinchuk
Witco Chemical Company
P. O. Box 418
Marcus Hook, Pa.

Dear Andy:

We are supplying Trainer with Barium Hydroxide, Monohydrate for conversion to Paranox 30. This material is considered a Hazardous Material under DOT shipping regulations. We have instructed Borne Chemical in the procedures to follow in shipping this material to you in our behalf.

Attached for your information is our Hazard Data sheet for Barium Monohydrate. It outlines important health protection information as well as properties and fire fighting and spill control procedures.

Very truly yours,

G. L. OTIS, JR.

By C. F. Wood

CFW/sqr

Att.

RECEIVED
APR 1 '76 - 9 00 A.M.
WITCO CHEMICAL
TRAINER, PA.

ATTACHMENT J

Witco File No. 3527

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

Form No. LSB-OOS-
May 1969

ORIGINAL (Red)

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
The Sherwin-Williams Co.	

~~ADDRESS (Number, Street, City, State, and ZIP Code)~~ Chemical Name and Synonyms
Barium Hydroxide Monohydrate, Barium Monohydrate

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
	Barium Monohydrate

CHEMICAL FAMILY	FORMULA
Barium Compound, Inorganic	$Ba(OH)_2 \cdot H_2O$

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS *N. A.			BASE METAL N. A.		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
N. A.		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	N. A.	SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)	N. A.	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)	N. A.	EVAPORATION RATE (_____=1)	
SOLUBILITY IN WATER	4.13 g $Ba(OH)_2 \cdot H_2O$ per 100 g H_2O at 20°C		
APPEARANCE AND ODOR	White crystalline solid with no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
N. A.	N. A.		

EXTINGUISHING MEDIA
N. A.

SPECIAL FIRE FIGHTING PROCEDURES
This material is very water soluble and is very caustic.
Avoid water.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Water soluble.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 0.5 mg/Cu m air

EFFECTS OF OVEREXPOSURE Material is caustic and irritates eyes, nose and throat. Can produce dermatitis. Ingestion produces abdominal pain, vomiting, violent purging, convulsions.

EMERGENCY AND FIRST AID PROCEDURES Wash affected area well with water. For ingestion - rapid oral administration of a soluble sulfate in water, i.e. sodium sulfate (2 oz.) or alum (4 g).

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Acid and water.
	STABLE	x	

INCOMPATABILITY *(Materials to avoid)* Avoid acids and water

HAZARDOUS DECOMPOSITION PRODUCTS None

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	x	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Material should be handled the same as any caustic material. Sweep up dry using protective gloves and respirator. Finally wash well with water.

WASTE DISPOSAL METHOD Dispose of waste in sealed container.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify)* MSA Dustfoe #66 Respirator

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES Rubber gloves

EYE PROTECTION Goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Store away from moisture and acid fumes in a cool place.

OTHER PRECAUTIONS

MATERIAL SAFETY DATA SHEET

ORIGINAL (Red)

Ashland

Date Prepared: 01/26/98
Date Printed: 12/06/01
MSDS No: 999.0001447-007.007

METHANOL

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: METHANOL
SAP Material No: 7350000 000 00B
General or Generic ID: ALCOHOL

Company
Ashland
Ashland Distribution Co. &
Ashland Specialty Chemical Co.
P. O. Box 2219
Columbus, OH 43216
614-790-3333

Emergency Telephone Number:
1-800-ASHLAND (1-800-274-5263)
24 hours everyday

Regulatory Information Number:
1-800-325-3751

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
METHYL ALCOHOL	67-56-1	100.0

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye
May cause mild eye irritation. Symptoms include stinging, tearing, and redness.

Skin
May cause mild skin irritation. Prolonged or repeated contact may dry the skin. Symptoms may include redness, burning, drying and cracking of skin, and skin burns. Passage of this material into the body through the skin is possible, and may add to toxic effects from breathing or swallowing.

Swallowing
Swallowing this material may be harmful.

Inhalation
Breathing of vapor or mist is possible. Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms usually occur at air concentrations higher than the recommended exposure limits (See Section 8).

Symptoms of Exposure
Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), leg cramps, pain in the abdomen and lower back, blurred vision, shortness of breath, cyanosis (causes blue coloring of the skin and nails from lack of oxygen), visual impairment (including blindness), coma, and death.

Continued on next page

ORIGINAL (Red)

Target Organ Effects
Exposure to lethal concentrations of methanol has been shown to cause damage to organs including liver, kidneys, pancreas, heart, lungs and brain. Although this rarely occurs, survivors of severe intoxication may suffer from permanent neurological damage. Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: central nervous system damage, Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans: visual impairment.

Developmental Information
Methanol has caused birth defects in laboratory animals, but only when inhaled at extremely high vapor concentrations. The relevance of this finding to humans is uncertain.

Cancer Information
No data

Other Health Effects
No data

Primary Route(s) of Entry
Inhalation, Skin absorption, Skin contact, Eye contact.

4. FIRST AID MEASURES

Eyes
If symptoms develop, move individual away from exposure and into fresh air. Flush eyes gently with water while holding eyelids apart. If symptoms persist or there is any visual difficulty, seek medical attention.

Skin
Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Swallowing
Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation
If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

Note to Physicians
This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin, lung (for example, asthma-like conditions), liver, kidney, central nervous system, pancreas, heart

Continued on next page

ORIGINAL (Red)

Exposure to this material may aggravate any preexisting condition sensitive to a decrease in available oxygen, such as chronic lung disease, coronary artery disease or anemias.

5. FIRE FIGHTING MEASURES

Flash Point
54.0 F (12.2 C) TCC

Explosive Limit
(for product) Lower 6.0 Upper 36.0 %

Autoignition Temperature
725.0 F (385.0 C)

Hazardous Products of Combustion
May form: carbon dioxide and carbon monoxide.

Fire and Explosion Hazards
Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electric motors, static discharge, or other ignition sources at locations distant from material handling point. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.

Extinguishing Media
alcohol foam, carbon dioxide, dry chemical.

Fire Fighting Instructions
Water may be ineffective. Water may be used to keep fire-exposed containers cool until fire is out. Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.

NFPA Rating
Health - 1, Flammability - 3, Reactivity - 0

6. ACCIDENTAL RELEASE MEASURES

Small Spill
Absorb liquid on vermiculite, floor absorbent or other absorbent material.

Large Spill
Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source. Prevent from entering drains, sewers, streams or other bodies of water. Prevent from spreading. If runoff occurs, notify authorities as required. Pump or vacuum transfer spilled product to clean containers for recovery. Absorb unrecoverable product. Transfer contaminated absorbent, soil and other materials to containers for disposal. Prevent run-off to sewers, streams or other bodies of water. If run-off occurs, notify proper authorities as required, that a spill has occurred.

Continued on next page

ORIGINAL (Red)

7. HANDLING AND STORAGE

Handling

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed. All five-gallon pails and larger metal containers, including tank cars and tank trucks, should be grounded and/or bonded when material is transferred. Warning. Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into vacuum equipment, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye Protection

Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.

Skin Protection

Wear resistant gloves (consult your safety equipment supplier)., To prevent repeated or prolonged skin contact, wear impervious clothing and boots..

Respiratory Protections

If workplace exposure limit(s) of product or any component is exceeded (see exposure guidelines), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.

Engineering Controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

Exposure Guidelines

Component

METHYL ALCOHOL (67-56-1)
OSHA PEL 200.000 ppm - TWA
OSHA VPEL 200.000 ppm - TWA (Skin)
OSHA VPEL 250.000 ppm - STEL (Skin)
ACGIH TLV 200.000 ppm - TWA (Skin)
ACGIH TLV 250.000 ppm - STEL (Skin)

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point

(for product) 147.0 F (63.8 C) @ 760 mmHg

Continued on next page

ORIGINAL (Red)

METHANOL

Vapor Pressure
(for product) 97.680 mmHg @ 68.00 F

Specific Vapor Density
1.110 @ AIR=1

Specific Gravity
.792 @ 68.00 F

Liquid Density
6.600 lbs/gal @ 68.00 F
.792 kg/l @ 20.00 C

Percent Volatiles
100.0 %

Volatile Organic Compounds (VOC)
100.000 %
795.000 g/l
6.630 lbs/gal

Evaporation Rate
2.10 (N-BUTYL ACETATE)

Appearance
CLEAR, MOBILE

State
LIQUID

Physical Form
NEAT

Color
COLORLESS

Odor
MILD ALCOHOL

pH
No data

Viscosity
.6 cps

Freezing Point
-144.0 F (-97.7 C)

Molecular Weight
32.0

Solubility in Water
COMPLETE

Bulk Density
.890 lbs/ft3

Continued on next page

ORIGINAL (Red)

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.

Hazardous Decomposition
May form: carbon dioxide and carbon monoxide.

Chemical Stability
Stable.

Incompatibility
Avoid contact with: reactive metals such as aluminum and magnesium, strong acids, strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION

No data

12. ECOLOGICAL INFORMATION

No data

13. DISPOSAL CONSIDERATION

Waste Management Information
Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Ashland Distribution Company, IC&S Environmental Services Group at 800-637-7922.

14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101

DOT Description:
METHANOL,3,UN1230,II

Container/Mode:
55 GAL DRUM/TRUCK PACKAGE

NOS Component:
None

RQ (Reportable Quantity) - 49 CFR 172.101

Product Quantity (lbs)	Component
5000	METHANOL

Continued on next page

15. REGULATORY INFORMATION

US Federal Regulations

TSCA (Toxic Substances Control Act) Status

TSCA (UNITED STATES) The intentional ingredients of this product are listed.

CERCLA RQ - 40 CFR 302.4(a)

Component	RQ (lbs)
METHYL ALCOHOL	5000

SARA 302 Components - 40 CFR 355 Appendix A

None

Section 311/312 Hazard Class - 40 CFR 370.2

Immediate(X) Delayed(X) Fire(X) Reactive( ) Sudden Release of Pressure( )

SARA 313 Components - 40 CFR 372.65

Section 313 Component(s)	CAS Number	%
METHANOL	67-56-1	100.00

OSHA Process Safety Management 29 CFR 1910

None listed

EPA Accidental Release Prevention 40 CFR 68

None listed

International Regulations

Inventory Status

AICS (AUSTRALIA) The intentional ingredients of this product are listed.
DSL (CANADA) The intentional ingredients of this product are listed.
ECL (SOUTH KOREA) The intentional ingredients of this product are listed.
EINECS (EUROPE) The intentional ingredients of this product are listed.
ENCS (JAPAN) The intentional ingredients of this product are listed.
PICCS (PHILIPPINES) The intentional ingredients of this product are listed.

State and Local Regulations

California Proposition 65

None

New Jersey RTK Label Information

METHYL ALCOHOL 67-56-1

Pennsylvania RTK Label Information

METHANOL 67-56-1

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

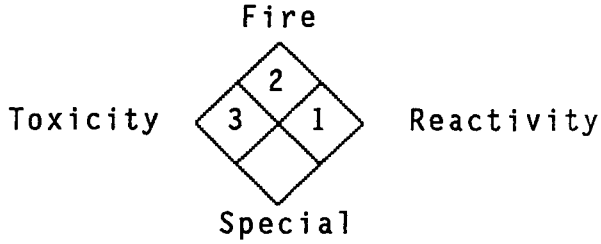
W I T C O M A T E R I A L S A F E T Y D A T A S H E E T

(ORIGINAL)

MAGNESIUM INTERMEDIATE (MI)

Product Code: SON MAG INTERMEDIATE

HAZARD RATING
N 4 - Extreme
F 3 - High
P 2 - Moderate
A 1 - Slight
0 - Insignificant



DIVISION AND LOCATION---SECTION I

Division: SONNEBORN
Location: CHESTER, PA
3300 WEST 4TH ST,TRAINER,PA,19013-0418
Emergency Telephone Number: (215) 494-3561
Transportation Emergency: CHEM TREC 1-(800) 424-9300 (U.S. and Canada)

CHEMICAL AND PHYSICAL PROPERTIES---SECTION II

Chemical Name:
magnesium 2-methoxyethoxide carbonate in ethylene glycol monomethylether
Formula: $MgCO_2(OC_2H_4OCH_3)_2$ in $CH_3OC_2H_4OH$
Hazardous Decomposition Products:
carbon dioxide on heating to about 185°F.
carbon monoxide and carbon dioxide from burning.
Incompatibility (Keep away from):
acids
strong oxidizers such as hydrogen peroxide, bromine, and chromic acid.

Toxic and Hazardous Ingredients:	%	CAS #
2-methoxyethoxide (ethylene glycol monomethylether)	78	109-86-4

Form: liquid Odor: sweet
Appearance: clear Color: light brown
Specific Gravity (water=1): 1.18 at 16°C
Boiling Point: decomposes at about 85°C (185°F)
Melting Point: not applicable
Solubility in Water (by weight %): 0 at 25°C
Volatile (by weight %): 92
Evaporation Rate: (n-butyl acetate = 1) .62
Vapor Pressure (mm Hg at 20°C): 6.2
Vapor Density (air=1): 2.62
pH (as is): not applicable
Stability: Product is stable under normal conditions
Viscosity SUS at 100°F: Greater than or = 100

FIRE AND EXPLOSION DATA---SECTION III

Special Fire Fighting Procedures:

(Continued on next page)

(Section III continued)

Firefighters must be equipped to prevent breathing of vapors or products of combustion. Wear an approved self-contained breathing apparatus and protective clothing.
Use water spray to cool adjacent surfaces and to protect personnel.

Unusual Fire and Explosion Hazards:
none

Flashpoint: (Method Used) Tag closed-cup 39°C (103°F)

Flammable limits %:
Lower: 2.5 Upper: 19.8

Extinguishing agents:
Drychemical or Waterspray or Waterfog or CO_2 or Foam or Sand/Earth
Closed containers exposed to fire may be cooled with water.

HEALTH HAZARD DATA---SECTION IV

Permissible concentrations (air):
2-methoxyethanol: (skin) 25 ppm (OSHA); 5 ppm (ACGIH)

Chronic effects of overexposure:
Repeated exposure to 2-methoxyethanol at high concentrations may cause injury to bone marrow, blood cells, kidney, liver and testes.
2-methoxyethanol causes reproductive effects in animals.

Acute toxicological properties:
2-methoxyethanol: If swallowed, may cause headache, dizziness, drowsiness, fatigue, nausea, vomiting, tremor, difficulty with speech, confusion and unconsciousness. Damage to the kidney has been described. Prolonged or widespread contact with skin may lead to absorption, resulting in symptoms of swallowing. Inhalation: headache, dizziness, drowsiness, fatigue, nausea, vomiting, loss of coordination, loss of appetite, tremors.

Emergency First Aid Procedures:
Eyes: Immediately flush with large quantities of water for at least 15 minutes and call a physician.
Skin Contact: Remove contaminated clothing. Wash skin with soap & water. If irritation develops, contact a physician.
Inhalation: Remove to fresh air. If breathing is difficult, give oxygen and call a physician
If Swallowed: Call a physician immediately. Induce vomiting if victim is conscious. Never give anything by mouth to an unconscious person.

SPECIAL PROTECTION INFORMATION---SECTION V

Ventilation Type Required (Local,mechanical,special):
Handle this product in a closed system. General (mechanical) room ventilation is then satisfactory.
Use adequate local exhaust to maintain solvents below exposure limits in Section IV. Respiratory protection required when levels exceed limits.

(Continued on next page)

ORIGINAL (RED)

(Section V continued)

Respiratory Protection (Specify type):
Use NIOSH/OSHA approved respirator with organic vapor cartridge if vapor concentration exceeds permissible exposure limit

Protective Gloves:
butyl rubber

Eye Protection:
chemical safety goggles

Other Protective Equipment:
chemically resistant clothing and apron

HANDLING OF SPILLS OR LEAKS---SECTION VI

Procedures for Clean-Up:
Keep public away. Shut off leak source if possible to do so without hazard. Wear protective equipment. Do not breathe vapors.
Prevent liquid from entering low areas. Alert appropriate authorities if material has entered a watercourse, sewer, soil, or vegetation.
Shut off sources of electrical arc, flame or spark. Dam up spills with inert material such as earth, sand or vermiculite, but DO NOT USE saw dust type material.

Waste Disposal:
Dispose of in accordance with all applicable federal, state and local regulations.

SPECIAL PRECAUTIONS---SECTION VII

Precautions to be taken in handling and storage:
Avoid exposure to temperatures greater than 150°F (66°C).
Wear protective clothing and equipment while handling.
Discard grossly contaminated shoes.
Avoid prolonged or repeated contact with skin or breathing of vapors, mists or fumes. Launder contaminated clothing before reuse. Keep containers tightly closed. Avoid strong oxidizers. Eliminate all sources of ignition such as flames or sparks.
Empty containers are hazardous. Follow all instructions in this Material Safety Data Sheet when handling empty containers.
see Section IX comments

TRANSPORTATION DATA---SECTION VIII

D.O.T.: Regulated
U.S. D.O.T. Proper Shipping Name: Ethylene glycol monomethylether
U.S. D.O.T. Hazard Class: Combustible liquid
I.D. Number: UN 1188

(Continued on next page)

(Section VIII continued)

Label(s) Required: not applicable
Reportable Quantity: not applicable
Freight Classification:
Special Transportation Notes:
Unregulated by DOT when shipped in containers of less than 110 gallons.

COMMENTS---SECTION IX

Avoid contact with skin, eyes, and clothing. Wash thoroughly after handling. Wash clothing before reuse.
Prevent accumulation of static electricity by grounding trailers and/or drums when filling.
DO NOT breathe vapors.

Signature: Paul Tietze _____
Title: Manager, Tech. Service (212) 605-3908
Original Date: 11/16/87 Sent to: _____
Revision Date: _____
Supersedes : _____
Date Sent : _____

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for any loss, damage, or expense, direct or consequential, arising out of their use.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUB-JECT:	Stoney Creek Technologies, LLC Confidential Business Information Claim	02/15/05
FROM:	Carlyn Winter Prisk, Investigator PRP Investigation and Site Information Section	
TO:	File	

Attachments M through W have been removed from the file, subject to a claim for trade secrets under TSCA. The documents are in the possession of the TSCA program and awaiting a formal determination by EPA head quarters.